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(54) Wrinkle resistant composition

(57) There is provided a wrinkle reducing composition comprising a cross-linking resin having the property of being cationic and a component having the property of being co-cross linked with the resin and/or a component comprising at least one unit which provides a dye transfer inhibiting benefit; and article of manufacture thereof. Also herein provided are method of treating fabrics for imparting various benefits including reducing wrinkles; improving the natural drape of fabrics, imparting a crisp finish to fabrics, reducing the time and/or effort involved to iron fabrics, imparting crease resistance to fabrics, imparting post wash wrinkle resistance to fabrics, imparting in-wear wrinkle resistance to fabrics, imparting a reduction of the fabric aging upon multiple application.

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Description

Technical field of the invention

[0001] The present invention relates to fabric care compositions and to a method for treating fabrics in order to improve various properties of fabrics, in particular, wrinkle resistance.

Background of the invention

[0002] Wrinkles in textile fabrics are caused by the bending and creasing of the textile material which places an external portion of a filament in a yarn under tension while the internal portion of that filament in the yarn is placed under compression. Particularly with cotton fabrics, the hydrogen bonding that occurs between the cellulose molecules contributes to keeping wrinkles in place. The wrinkling of fabric, in particular clothing, is therefore subject to the inherent tensional elastic deformation and recovery properties of the fibers which constitute the yarn and fabrics.

[0003] In the modern world, with the increase of hustle and bustle and travel, there is a demand for a quick fix which will help to diminish the labor involved in home laundering and/or the cost and time involved in dry cleaning or commercial laundering. Further, it is well known that alternating cycles of using and laundering fabrics and textiles, such as articles of worn clothing and apparel, will inevitably adversely affect the appearance and integrity of the fabric and textile items so used and laundered. Fabrics and textiles simply wear out over time and with use. Laundering of fabrics and textiles is necessary to remove soils and stains which accumulate therein and thereon during ordinary use. However, the laundering operation itself, over many cycles, can accentuate and contribute to the deterioration of the integrity and the appearance of such fabrics and textiles. Accordingly, this has brought additional pressure to bear on textile technologists to produce a product that will sufficiently reduce wrinkles in fabrics, especially clothing, and to produce a good appearance through a simple, convenient application of a product.

[0004] The prior art contains numerous examples of compositions for reducing wrinkles. U.S. 5,532,023, discloses aqueous wrinkle control compositions containing non-volatile silicone and film forming polymer. Preferred silicones include reactive silicones and amino-functional silicone, known as "aminodimethicone". The composition containing such silicones is applied to fabric from a spray dispenser. It is found that in the spray treatment, an appreciable amount of the aqueous composition misses the fabric, and instead falls on flooring surfaces, such as rugs, carpets, concrete floors, tiled floors, linoleum floors, bathtub floors, which leaves a silicone layer that is accumulated on and/or cured on and/or bonded to the flooring surfaces. Such silicones that are accumulated on such surfaces, and especially those that are bonded to such surfaces are difficult to remove. Flooring surfaces thus become slippery and can present a safety hazard to the household members. U.S. 5,573,695 discloses an aqueous wrinkle removal composition containing a vegetable oil based cationic quaternary ammonium surfactant, and an anionic fluorosurfactant. Similarly, U.S. 4,661,268 discloses a wrinkle removal spray comprising an aqueous alcoholic composition containing a dialkyl quaternary ammonium salt and a silicone surfactant and/or a fluoro surfactant. U.S. 5,100,566 discloses a method of reducing wrinkles in fabric by spraying the fabric with an aqueous alcoholic solution of an anionic siliconate alkali metal salt. U.S. 4,806,254 discloses fabric wrinkle removal aqueous alcoholic solution containing glycerine and a nonionic surfactant. W098/04772 provides the treatment of fabric against fabric creasing by application of a composition comprising a polycarboxylic acid or derivative thereof; and then curing the composition using a domestic process. These patents are incorporated herein by reference.

[0005] Accordingly, the domestic treatment of fabric is a problem known in the art to the formulator of laundry compositions.

[0006] In addition, the problem of wrinkle reduction in industrial field is known in the art. Hence, processes for the industrial durable press treatment of textile fabrics were first introduced in the 1960's and have achieved widespread use since that time. These durable press treatment processes typically involve treating the fibers of the textile fabrics with cross-linking agents. Early durable press processes used formaldehyde as a cross-linking agent which, although effective, was highly odorous and undesirable to the consumer.

[0007] As a consequence, formaldehyde was replaced by reactive resins such as dimethylol urea (DMU), dimethylol ethylene urea (DMEU), and by modified ethylene urea resins, such as dimethylol dihydroxy ethylene urea (DMDHEU). However, still it is known that the desired increases in the durable press performance through the use of cross-linking agents are sometimes accompanied by undesirable losses in other important fabric properties, such as tensile strength, tear strength, abrasion resistance and fabric hand.

[0008] Further, solutions obtained from industry are not usually transposable to domestic treatments. Indeed, in industrial processes a strict control over parameters such as pH, electrolyte concentration, water hardness, temperature, etc.. is possible whereas in a domestic washing machine, such a high level of control is not possible. One typical example is given in GB-2,185,499, which provides the use of a polyamide-epichlorhydrin resin in a dip-pad industrial process wherein the polymer is used in the presence of an acrylic polymer. However, such a composition would not

be suitable for conventional domestic process involving a curing step, like ironing. Indeed, it has been found that acrylic polymer in presence of the polyamide-epichlorhydrin resin forms precipitates, thereby leaving undesirable residues on the treated fabrics.

[0009] In addition, domestic durable press treatments require conditions that industrial treatments do not have to fulfill. Hence, for domestic durable treatments, the compounds or compositions thereof need to manifest at least one of the following properties:

i)-provide a low level of aldehyde; indeed aldehyde based cross-linker technologies are less favoured in domestic process from an environmental and safety standpoint because contrary to industry where the process is controlled, in domestic process the consumer is the only person using the product, thus enabling the possibility of misuse. Further, high levels of aldehyde tends to produce an odour which would deter the consumer from using it again. Thus, it is desired to provide durable processes for use in domestic process which are safe to the consumer and provide a good odour acceptance;

ii)-provide a low or even no tensile strength loss; again as stated above for i), the control of the process in domestic treatment is less measurable. Further, contrary to industry where the fabrics are treated once, domestic treatment involves repeated usage and thus produce a tensile strength loss. Thus, it is desired to provide durable processes for use in domestic process which provide a low or even no tensile strength loss;

iii)-be usable at low temperature; indeed in a domestic process, and in particular in a domestic rinse process, it is not practical to rely on high treatment temperatures such as those used in industrial processes. Thus, it is also a further desire of domestic durable press to provide a better performance at low temperatures. Indeed, industry usually achieves a better performance by close control of the reaction process and its various parameters involved; whereas in domestic treatment this close control cannot be achieved. Consequently, the performance of the durable press process needs mostly to be achieved by use of efficient technology, instead of process features;

iv)-be applicable in rinse applications as well as in other domestic treatment like laundry machine, soaking, pre-treatment: in such type of application, easier control of the use of the product is achieved, thereby avoiding misuse. Thus, for domestic treatment, the technology involved in the durable press process needs preferably to be suitable for use in one of such application.
and/or

V)-not provide stiffness to fabrics. Again, as described for ii), the repeated usage that are involved in domestic treatment may also lead to stiff fabric. Accordingly, it is desired to provide durable press process which reduces such negative.

[0010] In addition to the above, industrial processes use high concentrations of cross-linking agents which is required for industrial scale treatment whilst for domestic treatment a low level is most preferred for economical reasons.

[0011] Accordingly, notwithstanding the advances in the art, there is still a need for an efficient and economical composition which provides effective domestic durable press properties on the treated fabrics.

[0012] Recently, a new class of materials, namely the polyamide-epichlorhydrin resins, conventionally known in the paper industry under the tradename Kymene, have found increasing use in the domestic treatment of fabrics in order to provide durable press benefits. One typical disclosure is given in co-pending European patent application No. 98870173. That application also exemplifies a combination of 15% polyamide/polyamine/epichlorhydrin polymers (Kymene polymers) with 5% polyethylene imine with 7 ethoxylations. In addition, polyamide-epichlorhydrin resins are known for use in industrial treatment, but with the disadvantages highlighted above.

[0013] It has now surprisingly been found that a cross-linking resin having the property of being cationic, in particular polyamide-epichlorhydrin resins, are stabilized in the presence of a component having the property of being co-cross linkable with the resin and/or a component, preferably polymer, comprising at least one unit which provides a dye transfer inhibiting benefit. Not to be bound by any theory, it is believed that by the addition of such polymer, electrostatic interactions between the cationic group of the resin and the polar group of the polymer occur thereby resulting in a so-called "polyelectrolyte complex". As a result, a synergistic benefit on crease resistance as well as on fabric appearance like better dewrinkling , better colour protection, and/or reduced abrasion is observed.

[0014] Still surprising, it has also been found that the use of this combination shows a synergistic increase performance as to the crease resistance and fabric crispness/hand on the treated fabrics. Further, by use of this compositions, conditions i) to v) are still fulfilled.

[0015] Accordingly, the present invention reduces wrinkles in fabrics, including clothing, dry cleanables, linens, bed clothes, and draperies, by ironing. The present invention can be used on damp or dry clothing to relax wrinkles and

give clothes a ready to wear or use look that is demanded by today's fast paced world.

[0016] In a preferred aspect, an additional benefit of the composition of the present invention is an improved garment shape, body and crispness.

[0017] The composition of the present invention acts as an excellent ironing aid. The present invention makes the task of ironing easier and faster by creating less iron drag. The compositions of the present invention help produce a crisp, smooth appearance.

Summary of the invention

[0018] The present invention is a wrinkle reducing composition comprising:

a)-a cross-linking resin having the property of being cationic; and
b)-a component having the property of being co-cross linkable with the resin and/or a component comprising at least one unit which provides a dye transfer inhibiting benefit;

with the proviso that when the cross-linking resin is a polyquaternary amine resin of the polyamide/polyamine/epichlorhydrin type present in amount of 15% by weight, the amino functional polymer is not a polyethylene imine with 7 ethoxylations present in amount of 5% by weight.

[0019] In another aspect of the invention, there is provided an article of manufacture comprising the composition of the invention.

[0020] Still in a further aspect of the invention, there is provided a method of treating fabrics for imparting benefits selected from the group consisting of: reducing wrinkles; improving the natural drape of fabrics, imparting a crisp finish to fabrics, reducing the time and/or effort involved to iron fabrics, imparting crease resistance to fabrics, i.e. imparting post wash wrinkle resistance to fabrics as well as imparting in-wear wrinkle resistance to fabrics, imparting a reduction of the fabric aging upon multiple application. By "post wash wrinkle resistance" it is meant, wrinkle resistance during several laundry cycles; by "in-wear wrinkle resistance" it is meant, wrinkle resistance during wear of the garments and by "fabric aging" it is meant color loss, abrasion, pilling or fuzzing of the fabric

[0021] In a further aspect of the invention, there is provided an article of manufacture comprising a container and the composition of the invention in association with instructions to use.

Detailed description of the invention

1)-Cross-linking resin having the property of being cationic

[0022] An essential component of the invention is a cross-linking resin having the property of being cationic. By "cross-linking resin having the property of being cationic", it is meant that the resin is at least partially positively charged. It is not however necessary that the reactive part of the molecule carries the positive charge. Indeed, polymeric resins can be based on positively charged monomers which help the deposition on the fibers. Since the cross-linking resins are cationic, i.e. positively charged, they are deposited and well retained on the negatively charged cellulosic fibers when these resins are added to the final rinse of a laundry process.

[0023] Cross-linking resins having the property of being cationic suitable for use herein are those commonly known as having wet strength in the paper field. At least two mechanisms have been postulated to account for the mechanism by which wet strength resin act. One is that wet strength resins form covalent bonds between adjacent fibers while another is that the wet strength resin places a layer over the hydrogen bonds formed between adjacent paper fibers and thus prevents water from breaking the hydrogen bonds.

[0024] Conventional wet-strength agents suitable for use herein include compounds made of epichlorohydrin adducts of polyamine resins, polyethyleneimine resins, cationic starch, polydiallyldimethylammonium chloride, and mixtures thereof, amine-aldehyde resins such as melamine-formaldehyde resin, amide-aldehyde resins, and mixtures thereof. For use within the meaning of the present invention, there can also be used materials of the above-mentioned classes of substances which admittedly do not themselves possess any outstanding wet-strength properties but, nevertheless, have the same durable press effect as do the wet-strength agents as described therein.

[0025] Among the class of epichlorohydrin adducts of polyamine resins, polyethyleneimine resins, cationic starch, polydiallyldimethylammonium chloride, and mixtures thereof, the preferred components are the polymeric amine-epichlorohydrin resins selected from the group consisting of a polyamide-epichlorohydrin (PAE) resin, a polyalkylenepolyamine-epichlorohydrin (PAPAE) resin, and an amine polymer-epichlorohydrin (APE) resin, in which the amine groups have been alkylated with epichlorohydrin to produce a polyamine-epichlorohydrin resin that has azetidinium or epoxide functionality. Preferably, for use herein, the cross-linking resin having cationic properties is a cationic wet strength resin that is produced by reacting a saturated aliphatic dicarboxylic acid containing three to ten carbon atoms with a poly-

alkylenepolyamine, containing from two to four ethylene groups, two primary amine groups, and one to three secondary amine groups (such as diethylenetriamine, triethylenetetramine and tetraethylenepentamine), to form a poly(aminoamide) having secondary amine groups that are alkylated with epichlorohydrin to form a PAE resin.

[0026] These polyamide/polyamine/epichlorohydrin wet-strength resins are fully described by Carr, Doane, Hamerstrand and Hofreiter, in an article appearing in the Journal of Applied Polymer Science Vol. 17, pp. 721-735 (1973). Such resins are available as KYMENE from Hercules, Inc. A commercial synthesis of such resins from adipic acid, diethylene triamine and epichlorohydrin is described in the Carr et al publication, ibid., and is U.S. Pat. No. 2,926,154 (Feb. 23, 1960) to G. I. Keim or US 4,240,995. Reference can be made to these publications for further details regarding the preparation of polyamide/polyamine/epichlorohydrin resins.

[0027] Most preferred cross-linking resin having cationic properties from this class are the wet strength resin Kymene 557H (available from Hercules Incorporated), in which adipic acid is reacted with diethylenetriamine to form a poly (aminoamide) that is alkylated and crosslinked with epichlorohydrin to form a PAE resin. Still another preferred cross-linking resin having cationic properties made of epichlorohydrin are Luresin.RTM and Etadurin which both are polyamidoamine-epichlorohydrin resins.

[0028] Amine-aldehyde resins are suitable cross-linking resins for the present invention and are made by condensation of amine or amide monomers with aldehydes such as formaldehyde or glyoxal. Preferred amines are those having low molecular weight amines e.g. melamine or polymeric amines e.g. poly-diallylamine, preferably quarternized. Preferred amides are those polymeric amides such as polyacrylamide. All these suitable amine/amide monomers can also be copolymerized with cationic monomers.

[0029] Among the class of amine-aldehyde cross-linking resin, preferred are those from the class of melamine-formaldehyde resin. Melamine-formaldehyde resins of this type are known as crosslinking agents of this type in the coating industry and are also described, for example, in German Auslegeschrift Nos. 2,457,387 (U.S. Pat. No. 4,035,213 incorporated herein by reference) and 1,719,324 and, in particular, in U.S. Pat. No. 3,242,230 incorporated herein by reference.

[0030] Preferred melamine-formaldehyde resin are those commercially available under the tradenames Madurit, and Cassurit from Clariant.

[0031] Still other preferred cross-linking resin having the property of being cationic among the class of amine-aldehyde cross-linking resin are the Poly(acrylamide-glyoxal) resin commercially available under the tradename SOLIDURIT KM from Clariant.

[0032] According to the present invention, there can also be used a mixture of wet-strength agents of the above-mentioned types or equivalent compounds.

[0033] Preferably for the purpose of the invention, the cross-linking resin having cationic properties have a molecular weight between 200 and 1,000,000, preferably between 500 and 100,000, most preferably between 1000 and 25,000. Cross-linking resin having a low molecular weight are most preferred for use in the present invention as they are more water-soluble and have a better fiber penetration. By low molecular weight it is meant a molecular weight within the range of from 25 to 2000, preferably from 50 to 1000, and more preferably from 50 to 500.

[0034] The above cross-linking components may be used in a composition for delivery onto fabric, such as by means of a spray process.

[0035] It is desirable if the level of cross-linking components or derivative thereof is present in an amount of from 0.01% to 60%, preferably from 0.1% to 30% by weight of the total composition. Typically, the level of cross-linking component is present in the composition in a sufficient amount to result in an amount of from 0.01% to 60%, preferably of from 0.1 to 30%, by weight of cross-linking component per weight of dry fabrics.

[0036] It is advantageous for aldehyde containing cross-linking resins if a catalyst is used with compositions of the invention. Preferred catalysts includes organic acids such as citric acid, succinic acid, and tartaric acids, as well as conventional Lewis acid such as Al Cl_3 or $MgCl_2$, or salts thereof, or mixtures thereof. A typical example of catalyst is the catalyst NKD made of a mixture of salts and organic acid, and commercially available from Hoechst.

[0037] It is preferred if the level of catalyst is from 10% to 50%, preferably from 20 to 40% by weight of the cross-linking components or derivative thereof.

[0038] For other cross-linking resins like the Kymene, the use of a catalyst is not necessary.

2)-Component having the property of being co-cross linkable with the resin and/or a component comprising at least one unit which provides a dye transfer inhibiting benefit

[0039] A component having the property of being co-cross linkable with the resin and/or a component comprising at least one unit which provides a dye transfer inhibiting benefit are also essential components of the invention. By use of this component(s) with the resin, a synergistic increase in performance as to the crease resistance and fabric crispness/hand on the treated fabrics is obtained, in particular from duration standpoint. Indeed, the obtained benefits from a one-shot treatment have been shown to sustain over multiple wash cycles, e.g. of about 20 wash cycles. Of course,

the treatment with the invention composition can still be effected after each wash cycle, thereby further increasing the duration of the benefit treatment, even while wearing. Still, the use of that type of component having the property of being co-cross linkable with the resin or a component comprising at least one unit which provides a dye transfer inhibiting benefit has been found particularly beneficial to the stability of the resin, in particular those that are made of polyquaternary amine resins. Indeed, a clear homogenous solution is obtained.

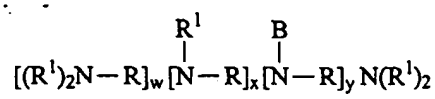
[0040] Preferred components having the property of being co-cross linkable with the resin are selected from polyamine polymers, amino-functional silicones, alkyl amines, and mixtures thereof.

[0041] The compositions of the present invention typically comprise from about 0.01 %, preferably from about 0.1% to about 20%, preferably to about 10% by weight, of a component having the property of being co-cross linkable with the resin and/or a component comprising at least one unit which provides a dye transfer inhibiting benefit.

Polyamine polymers

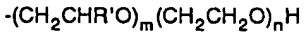
[0042] Polyamine polymers are suitable amino-functional polymers for use herein.

[0043] A preferred polyamine polymer has the formula:



wherein R, R^1 and B are suitably described in U.S. 5,565,145 Watson et al., issued October 15, 1996 incorporated herein by reference, and w, x, and y have values which provide for a backbone prior to substitution of preferably at least about 1200 daltons, more preferably 1800 daltons.

[0044] R^1 units are preferably alkyleneoxy units having the formula:



wherein R' is methyl or ethyl, m and n are preferably from about 0 to about 50, provided the average value of alkoxylation provided by m + n is at least about 0.5.

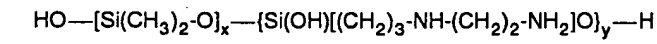
[0045] A further description of polyamine polymers suitable for use in the present invention is found in U.S. 4,891,160 Vander Meer, issued January 2, 1990; U.S.4,597,898, Vander Meer, issued July 1, 1986; European Patent Application 111,965, Oh and Gosselink, published June 27, 1984; European Patent Application 111,984, Gosselink, published June 27, 1984; European Patent Application 112,592, Gosselink, published July 4, 1984; U.S. 4,548,744, Connor, issued October 22, 1985; and U.S. 5,565,145 Watson et al., issued October 15, 1996; all of which are included herein by reference.

[0046] Preferred polyamines are linear and branched polyethyleneimines commercially available ex BASF under the tradename Lupasol®.

Amino-functional silicones

[0047] Amino-functional silicones are also useful components having the property of being co-cross linked with the resin for use herein. Typically, these component are conventionally known under the name of silicone lubricant. Preferred aminofunctional silicones are amodimethicone compounds commercially available ex Dow Corning under the tradename DC X (where X is preferably 949 or 939).

[0048] Suitable silicone materials include materials of the formula:



wherein x and y are integers which depend on the molecular weight of the silicone, preferably having a viscosity of from about 10,000 cst to about 500,000 cst at 25°C. This material is also known as "amodimethicone". Although silicones with a high number, e.g., greater than about 0.5 millimolar equivalent of amine groups can be used, they are not preferred because they can cause fabric yellowing.

[0049] Similarly, silicone materials which can be used correspond to the formulas:

$$(R^1)_aG_{3-a}\text{-Si-}(\text{-OSiG}_2)_n\text{-}(OSiG_b(R^1)_{2-b})_m\text{-O-SiG}_{3-a}(R^1)_a$$

wherein G is selected from the group consisting of hydrogen, phenyl, OH, and/or C_1-C_8 alkyl; a denotes 0 or an integer from 1 to 3; b denotes 0 or 1; the sum of n + m is a number from 1 to about 2,000; R^1 is a monovalent radical of formula $C_pH_{2p}L$ in which p is an integer from 2 to 8 and L is selected from the group consisting of:

$$\text{-N}(R^2)CH_2\text{-}CH_2\text{-N}(R^2)_2;$$

$$\text{-N}(R^2)_2;$$

$$\text{-N}^+(R^2)_3\ A^-;\ \text{and}$$

$$\text{-N}^+(R^2)CH_2\text{-}CH_2N^+H_2\ A\text{-}$$

wherein each R^2 is chosen from the group consisting of hydrogen, phenyl, benzyl, saturated hydrocarbon radical, and each A^- denotes compatible anion, e.g., a halide ion; and

$$R^3\text{—}N^+(CH_3)_2\text{—}Z\text{—}[Si(CH_3)_2O]_p\text{—}Si(CH_3)_2\text{—}Z\text{—}N^+(CH_3)_2\text{—}R^3 \bullet 2CH_3COO^-$$

wherein

$$Z = \text{-}CH_2\text{—}CH(OH)\text{—}CH_2O\text{—}CH_2)_3\text{—}$$

R^3 denotes a long chain alkyl group; and
f denotes an integer of at least about 2.

[0050] In the formulas herein, each definition is applied individually and averages are included.

[0051] Another silicone material which can be used, but is less preferred than polydimethyl siloxanes, has the formula:

$$(CH_3)_3Si\text{—}[O\text{-}Si(CH_3)_2]_n\text{—}\{OSi(CH_3)[(CH_2)_3\text{-NH-}(CH_2)_2\text{-}NH_2]\}_m\text{—}\ OSi(CH_3)_3$$

wherein n and m are the same as before. The preferred silicones of this type are those which do not cause fabric discoloration.

[0052] Alternatively, the silicone material can be provided as a moiety, or a part, of a non-silicone molecule. Examples of such materials are copolymers having siloxane macromers grafted thereto, which meet the functional limitations as defined above. That is, the non-silicone backbone of such polymers should have a molecular weight of from about 5,000 to about 1,000,000, and the polymer should have a glass transition temperature (Tg), i.e., the temperature at which the polymer changes from a brittle vitreous state to a plastic state, of greater than about -20°C.

Alkyl amines

[0053] Alkyl amines are also useful components, consisting of one or more linear or branched alkyl chains covalently linked onto a nitrogen atom. Preferred, but non-limiting examples of alkyl amines are methyl-, ethyl-, dimethyl-, diethyl-, and triethylamine.

Polymers comprising at least one unit which provide a dye transfer inhibiting benefit

[0054] The preferred polymers comprising at least one unit which provide a dye transfer inhibiting benefit are water-soluble polymers. For the purposes of the present invention the term "water-soluble" is defined as "a polymer which when dissolved in water at a level of 0.2% by weight, or less, at 25° C, forms a clear, isotropic liquid".

[0055] The polymers comprising at least one unit which provide a dye transfer inhibiting benefit useful in the present invention have the formula:

$$[\text{-P(D)}_m\text{-}]_n$$

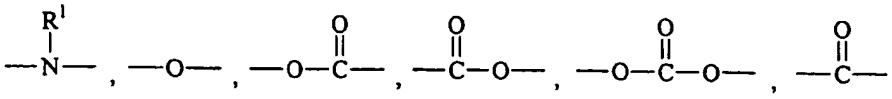
wherein the unit P is a polymer backbone which comprises units which are homopolymeric or copolymeric. D units are defined herein below. For the purposes of the present invention the term "homopolymeric" is defined as "a polymer backbone which is comprised of units having the same unit composition, i.e., formed from polymerization of the same monomer". For the purposes of the present invention the term "copolymeric" is defined as "a polymer backbone which is comprised of units having a different unit composition, i.e., formed from the polymerization of two or more monomers".

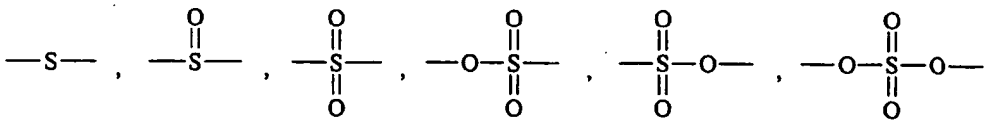
[0056] P backbones preferably comprise units having the formula:

$$\text{—[CR}_2\text{-CR}_2\text{]—} \text{ or } \text{—[(CR}_2)_x\text{-L]—}$$

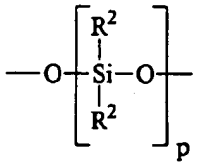
wherein each R unit is independently hydrogen, C_1-C_{12} alkyl, C_6-C_{12} aryl, and D units as described herein below; preferably C_1-C_4 alkyl.

[0057] Each L unit is independently selected from heteroatom-containing moieties, non-limiting examples of which are selected from the group consisting of:

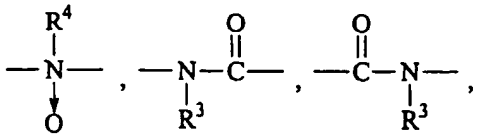




polysiloxane having the formula:



wherein the index p is from 1 to about 6; units which have dye transfer inhibition activity:

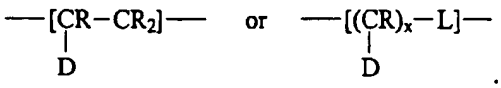


and mixtures thereof; wherein R^1 is hydrogen, C_1-C_{12} alkyl, C_6-C_{12} aryl, and mixtures thereof. R^2 is C_1-C_{12} alkyl, C_1-C_{12} alkoxy, C_6-C_{12} aryloxy, and mixtures thereof; preferably methyl and methoxy. R^3 is hydrogen C_1-C_{12} alkyl, C_6-C_{12} aryl, and mixtures thereof; preferably hydrogen or C_1-C_4 alkyl, more preferably hydrogen. R^4 is C_1-C_{12} alkyl, C_6-C_{12} aryl, and mixtures thereof.

[0058] The backbones of the polymers of the present invention comprise one or more D units which are units which comprise one or more units which provide a dye transfer inhibiting benefit. The D unit can be part of the backbone itself as represented in the general formula:

$$[P(D)_m\text{-}]_n$$

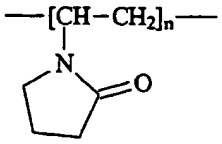
or the D unit may be incorporated into the backbone as a pendant group to a backbone unit having, for example, the formula:



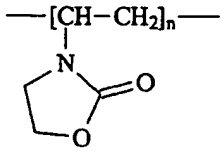
[0059] However, the number of D units depends upon the formulation. For example, the number of D units will be adjusted to provide water solubility of the polymer as well as efficacy of dye transfer inhibition. The molecular weight of the polymers of the present invention are from about 500, preferably from about 1,000, more preferably from about 10,000 to about 6,000,000, preferably to about 2,000,000, more preferably to about 1,000,000, yet more preferably to about 500,000, most preferably to about 360,000 daltons. Therefore the value of the index n is selected to provide the indicated molecular weight, and providing for a water solubility of at least 100 ppm, preferably at least about 300 ppm, and more preferably at least about 1,000 ppm in water at ambient temperature which is defined herein as 25°C.

Polymers Comprising Amide Units

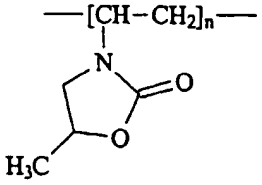
[0060] Non-limiting examples of preferred D units are D units which comprise an amide moiety. Examples of polymers wherein an amide unit is introduced into the polymer via a pendant group includes polyvinylpyrrolidone having the formula:



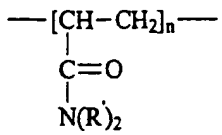
polyvinyloxazolidone having the formula:



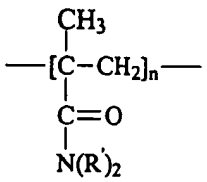
polyvinylmethyloxazolidone having the formula:



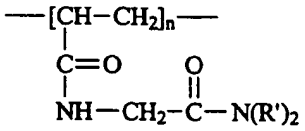
polyacrylamides and N-substituted polyacrylamides having the formula:



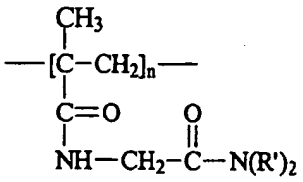
wherein each R' is independently hydrogen, C_1-C_8 alkyl, or both R' units can be taken together to form a ring comprising 4-6 carbon atoms; polymethacrylamides and N-substituted polymethacrylamides having the general formula:



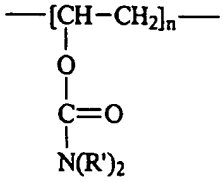
wherein each R' is independently hydrogen, C_1-C_6 alkyl, or both R' units can be taken together to form a ring comprising 4-6 carbon atoms; poly(N-acrylylglycinamide) having the formula:



wherein each R' is independently hydrogen, C_1-C_6 alkyl, or both R' units can be taken together to form a ring comprising 4-6 carbon atoms; poly(N-methacrylylglycinamide) having the formula:

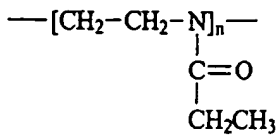


wherein each R' is independently hydrogen, C_1-C_6 alkyl, or both R' units can be taken together to form a ring comprising 4-6 carbon atoms; polyvinylurethanes having the formula:



wherein each R' is independently hydrogen, C_1-C_6 alkyl, or both R' units can be taken together to form a ring comprising 4-6 carbon atoms.

[0061] An example of a D unit wherein the nitrogen of the dye transfer inhibiting moiety is incorporated into the polymer backbone is a poly(2-ethyl-2-oxazoline) having the formula:



wherein the index n indicates the number of monomer residues present.

[0062] The amino-functional polymers of the present invention can comprise any mixture of dye transfer inhibition units which provides the product with suitable properties.

The preferred polymers which comprise D units which are amide moieties are those which have the nitrogen atoms of the amide unit highly substituted so the nitrogen atoms are in effect shielded to a varying degree by the surrounding non-polar groups. This provides the polymers with an amphiphilic character. Non-limiting examples include polyvinylpyrrolidones, polyvinyloxazolidones, N,N-disubstituted polyacrylamides, and N,N-disubstituted polymethacrylamides. A detailed description of physico-chemical properties of some of these polymers are given in "Water-Soluble Synthetic Polymers: Properties and Behavior", Philip Molyneux, Vol. I, CRC Press, (1983) included herein by reference.

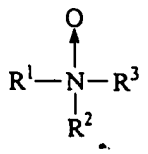
[0063] The amide containing polymers may be present partially hydrolyzed and/or crosslinked forms. A preferred polymeric compound for the present invention is polyvinylpyrrolidone (PVP). This polymer has an amphiphilic character with a highly polar amide group conferring hydrophilic and polar-attracting properties, and also has non-polar methylene and methine groups, in the backbone and/or the ring, conferring hydrophobic properties. PVP is readily soluble in aqueous and organic solvent systems. PVP is available ex ISP, Wayne, New Jersey, and BASF Corp., Parsippany, New Jersey, as a powder or aqueous solutions in several viscosity grades, designated as, e.g., K-12, K-15, K-25, and K-30. These K-values indicate the viscosity average molecular weight, as shown below:

PVP viscosity average molecular weight (in thousands of daltons)	K-12	K-15	K-25	K-30	K-60	K-90
	2.5	10	24	40	160	360

PVP K-12, K-15, and K-30 are also available ex Polysciences, Inc. Warrington, Pennsylvania, PVP K-15, K-25, and K-30 and poly(2-ethyl-2-oxazoline) are available ex Aldrich Chemical Co., Inc., Milwaukee, Wisconsin. PVP K30 (40,000) through to K90 (360,000) are also commercially available ex BASF under the tradename Luviskol or commercially available ex ISP. Still higher molecular PVP like PVP 1.3MM, commercially available ex Aldrich is also suitable for use herein. Yet further PVP-type of material suitable for use in the present invention are polyvinylpyrrolidone-co-dimethylaminoethylmethacrylate, commercially available ex ISP in a quaternised form under the tradename Gafquat® or commercially available ex Aldrich Chemical Co. having a molecular weight of approximately 1.0MM; polyvinylpyrrolidone-co-vinyl acetate, available ex BASF under the tradename Luviskol®, available in vinylpyrrolidone:vinylacetate ratios of from 3:7 to 7:3; polyvinylpyrrolidine-co-vinylimidazoliumquat, commercially available ex BASF under the tradename Luviquat®.

Polymers Comprising N-oxide Units

[0064] Another D unit which provides dye transfer inhibition enhancement to the polymers described herein, are N-oxide units having the formula:



wherein R^1, R^2, and R^3 can be any hydrocarbyl unit (for the purposes of the present invention the term "hydrocarbyl"

does not include hydrogen atom alone). The N-oxide unit may be part of a polymer, such as a polyamine, i.e., polyalkyleneamine backbone, or the N-oxide may be part of a pendant group attached to the polymer backbone. An example of a polymer which comprises an the N-oxide unit as a part of the polymer backbone is polyethyleneimine N-oxide. Non-limiting examples of groups which can comprise an N-oxide moiety include the N-oxides of certain heterocycles *inter alia* pyridine, pyrrole, imidazole, pyrazole, pyrazine, pyrimidine, pyridazine, piperidine, pyrrolidine, pyrrolidone, azolidine, morpholine. A preferred polymer is poly(4-vinylpyridine N-oxide, PVNO). In addition, the N-oxide unit may be pendant to the ring, for example, aniline oxide.

[0065] N-oxide comprising polymers of the present invention will preferably have a ration of N-oxidized amine nitrogen to non-oxidized amine nitrogen of from about 1:0 to about 1:2, preferably to about 1:1, more preferably to about 3:1. The amount of N-oxide units can be adjusted by the formulator. For example, the formulator may co-polymerize N-oxide comprising monomers with non N-oxide comprising monomers to arrive at the desired ratio of N-oxide to non N-oxide amino units, or the formulator may control the oxidation level of the polymer during preparation. The amine oxide unit of the polyamine N-oxides of the present invention have a Pk_a less than or equal to 10, preferably less than or equal to 7, more preferably less than or equal to 6. The average molecular weight of the N-oxide comprising polymers which provide a dye transfer inhibitor benefit to polymers is from about 500 daltons, preferably from about 1,000 daltons, more preferably from about 10,000 daltons to about 6,000,000 daltons, preferably to about 2,000,000 daltons, more preferably to about 360,000 daltons.

Polymers Comprising Amide Units and N-oxide Units

[0066] A further example of polymers which have dye transfer inhibition benefits are polymers which comprise both amide units and N-oxide units as described herein above. Non-limiting examples include co-polymers of two monomers wherein the first monomer comprises an amide unit and the second monomer comprises an N-oxide unit. In addition, oligomers or block polymers comprising these units can be taken together to form the mixed amide/N-oxide polymers. However, the resulting polymers must retain the water solubility requirements described herein above.

[0067] More preferably, the resin and the component capable of being co-cross-linked with the resin and/or of being amphiphilic are present in weight ratios of from 20:1 to 1:1, most preferably from 10:1 to 1:1. Within these ratio ranges, it has been found that above mentioned polymers or mixtures thereof, in combination with the polyamide-epichlorohydrin resins, show a synergistic increase performance as to the crease resistance and fabric crispness/hand on the treated fabrics.

Optionals

[0068] The composition of the invention may also comprises one or more of the following optional ingredients.

1)-Other additional fiber Lubricant

[0069] The present invention may use fiber lubricants to impart a lubricating property, or increased gliding ability, to fibers in fabric, particularly clothing. Not to be bound by theory, it is believed that water and other alcoholic solvents break, or weaken, the hydrogen bonds that hold the wrinkles in fabric, and fabric lubricants facilitate the movement of fibers with respect to one another (glide) to further release the fibers from the wrinkle condition in wet or damp fabrics. After the fabric is dried, the residual fiber lubricant, especially silicone, can provide lubricity to reduce the tendency of fabric to rewrinkle.

(a). Silicone

[0070] The present invention can use silicone, a preferred fiber lubricant, to impart a lubricating property, or increased gliding ability, to fibers in fabric, particularly clothing. Nonlimiting examples of useful silicones in the composition of the present invention include noncurable silicones such as polydimethylsilicone and volatile silicones, and curable silicones such as aminosilicones, phenylsilicones and hydroxysilicones. The word "silicone" as used herein preferably refers to water soluble as well as emulsified silicones, including those that are commercially available and those that are emulsified in the composition, unless otherwise described. Preferably, the silicones arehydrophilic; are neither irritating, toxic, nor otherwise harmful when applied to fabric or when they come in contact with human skin; are chemically stable under normal use and storage conditions; and are capable of being deposited on fabric.

[0071] A preferred class of nonionic silicone containing surfactants are the polyalkylene oxide polysiloxanes having a dimethyl polysiloxane hydrophobic moiety and one or more hydrophilic polyalkylene side chains, and having the general formula:

R1—(CH3)2SiO—[(CH3)2SiO]a—[(CH3)(R1)SiO]b—SiO]b—Si(CH3)2—R1

wherein a + b are from about 1 to about 50, preferably from about 1 to about 30 , more preferably from about 1 to about 25, and each R1 is the same or different and is selected from the group consisting of methyl and a poly(ethyleneoxide/propyleneoxide) copolymer group having the general formula:

-(CH2)n O(C2 H4 O)c (C3 H6 O)d R2

with at least one R1 being a poly(ethyleneoxy/propyleneoxy) copolymer group, and wherein n is 3 or 4, preferably 3; total c (for all polyalkyleneoxy side groups) has a value of from 1 to about 100, preferably from about 6 to about 100; total d is from 0 to about 14, preferably from 0 to about 3; and more preferably d is 0; total c+d has a value of from about 5 to about 150, preferably from about 7 to about 100 and each R2 is the same or different and is selected from the group consisting of hydrogen, an alkyl having 1 to 4 carbon atoms, and an acetyl group, preferably hydrogen and methyl group. Each polyalkylene oxide polysiloxane has at least one R1 group being a poly(ethyleneoxide/propyleneoxide) copolymer group.

[0072] Nonlimiting examples of this type of surfactants are the Silwet® surfactants which are available OSI Specialties Inc., a Division of Witco, Danbury, Connecticut. Representative Silwet® surfactants which contain only ethyleneoxy (C2H4O) groups are as follows.

Name	Average MW	Average a+b	Average total c
L-7608	600	1	8
L-7607	1,000	2	17
L-77	600	1	9
L-7605	6,000	20	99
L-7604	4,000	21	53
L-7600	4,000	11	68
L-7657	5,000	20	76
L-7602	3,000	20	29
L-7622	10,000	88	75

[0073] Nonlimiting examples of Silwet® surfactants which contain both ethyleneoxy (C2 H4 O) and propyleneoxy (C3 H6 O) groups are as follows.

Name	Average MW	EO/PO ratio
L-720	12,000	50/50
L-7001	20,000	40/60
L-7002	8,000	50/50
L-7210	13,000	20/80
L-7200	19,000	75/25
L-7220	17,000	20/80

[0074] The molecular weight of the polyalkyleneoxy group (R1) is less than or equal to about 10,000. Preferably, the molecular weight of the polyalkyleneoxy group is less than or equal to about 8,000, and most preferably ranges from about 300 to about 5,000. Thus, the values of c and d can be those numbers which provide molecular weights within these ranges. However, the number of ethyleneoxy units (-C2H4O) in the polyether chain (R1) must be sufficient to render the polyalkylene oxide polysiloxane water soluble. If propyleneoxy groups are present in the polyalkylenoxy chain, they can be distributed randomly in the chain or exist as blocks. Surfactants which contain only ethyleneoxy groups without propyleneoxy groups are preferred. Mixtures of Silwet® surfactants, in particular of Silwet surfactants which contain only propyleneoxy groups and Silwet surfactants which contain both ethyleneoxy and propyleneoxy groups, are also preferred. Preferred Silwet® surfactants are the L-7001, L-7087, L-7200, L-7280, L-7600, L-7608, L-7622, L-7657.

[0075] The preparation of polyalkylene oxide polysiloxanes is well known in the art. Polyalkylene oxide polysiloxanes of the present invention can be prepared according to the procedure set forth in U.S. Pat. No. 3,299,112, incorporated

herein by reference. Typically, polyalkylene oxide polysiloxanes of the surfactant blend of the present invention are readily prepared by an addition reaction between a hydrosiloxane (i.e., a siloxane containing silicon-bonded hydrogen) and an alkenyl ether (e.g., a vinyl, allyl, or methallyl ether) of an alkoxy or hydroxy end-blocked polyalkylene oxide). The reaction conditions employed in addition reactions of this type are well known in the art and in general involve heating the reactants (e.g., at a temperature of from about 85° C. to 110° C.) in the presence of a platinum catalyst (e. g., chloroplatinic acid) and a solvent (e.g., toluene).

[0076] Other usefull silicones are volatile silicone fluids which can be cyclic silicone fluid of the formula $[(CH_3)_2SiO]_n$ where n ranges between about 3 to about 7, preferably about 5, or a linear silicone polymer fluid having the formula $(CH_3)_3SiO[(CH_3)_2SiO]_mSi(CH_3)_3$ where m can be 0 or greater and has an average value such that the viscosity at 25°C of the silicone fluid is preferably about 5 centistokes or less.

[0077] The non-volatile silicones that are useful in the composition of the present invention is polyalkyl and/or phenylsilicones silicone fluids and gums with the following structure:

$$A—Si(R_2)—O—[Si(R_2)—O—]_q—Si(R_2)—A$$

[0078] The alkyl groups substituted on the siloxane chain (R) or at the ends of the siloxane chains (A) can have any structure as long as the resulting silicones remain fluid at room temperature.

[0079] Each R group preferably can be alkyl, aryl, hydroxy, or hydroxyalkyl group, and mixtures thereof, more preferably, each R is methyl, ethyl, propyl or phenyl group, most preferably R is methyl. Each A group which blocks the ends of the silicone chain can be hydrogen, methyl, methoxy, ethoxy, hydroxy, propoxy, and aryloxy group, preferably methyl. Suitable A groups include hydrogen, methyl, methoxy, ethoxy, hydroxy, and propoxy. q is preferably an integer from about 7 to about 8,000. The preferred silicones are polydimethyl siloxanes; more preferred silicones are polydimethyl siloxanes having a viscosity of from about 50 to about 1000,000 centistokes at 25°C. Mixtures of volatile silicones and non-volatile polydimethyl siloxanes are also preferred. Suitable examples include silicones offered by Dow Corning Corporation and General Electric Company.

[0080] When silicone is present, it is present at least an effective amount to provide lubrication of the fibers, typically minimum levels of wrinkle control agent included in the composition are at least about 0.025%, preferably at least about 0.05%, more preferably at least about 0.1%, even more preferably at least about 0.2%, even more highly preferably at least about 0.4%, and most preferably at least about 0.5% and typically maximum levels of wrinkle control composition are about 10%, preferably less than about 5%, more preferably less than about 3%, by weight of the usage composition.

(b). Synthetic solid particles

[0081] Solid polymeric particles of average particle size smaller than about 10 microns, preferably smaller than 5 microns, more preferably smaller than about 1 micron, e.g., Velustrol® P-40 oxidized polyethylene emulsion available from Clariant, can be used as a lubricant, also Tospearl™ 105, 120, 130, 145, 240 polydimethyl siloxane polymers available from GE Silicones, since they can provide a "roller-bearing" action. When solid polymeric particles are present, they are present at an effective amount to provide lubrication of the fibers, typically from about 0.01% to about 3%, preferably from about 0.05% to about 1%, more preferably from about 0.1% to about 0.5%, by weight of the usage composition.

(c). Quaternary Ammonium Compounds

[0082] Although many quaternary ammonium compounds with alkyl substituents are suitable for this composition, quaternary ammonium compounds that contain hydrocarbon groups, including substituted groups and groups that are part of, e.g., acyl groups, which are unsaturated or branched are particularly suited for this composition. In some cases, amine precursors of the quaternary ammonium compounds can themselves be useful in this composition.

[0083] Typical levels of incorporation of the quaternary ammonium compound (active) in the wrinkle composition are of from about 0.025% to about 10% by weight, preferably from about 0.05% to about 5%, more preferably from about 0.1% to about 3%, and even more preferably from about 0.2% to about 2%, by weight of the composition, and preferably is biodegradable as disclosed hereinafter.

[0084] Suitable quaternary ammonium compounds for use in the wrinkle composition have been previously disclosed in U. S. Pat. No. 5,759,990, issued Jun. 2, 1998 in the names of E. H. Wahl, H. B. Tordil, T. Trinh, E. R. Carr, R. O. Keys, and L. M. Meyer, for Concentrated Fabric Softening Composition with Good Freeze/Thaw Recovery and Highly Unsaturated Fabric Softener Compound Therefor, and in U. S. Pat. No. 5,747,443, issued May 5, 1998 in the names of Wahl, Trinh, Gosselink, Letton, and Sivik for Fabric Softening Compound/Composition. An indicator of the suitability

of quaternary ammonium actives for use in the compositions of the present invention is the phase transition temperature. Preferably, the phase transition temperature of the quaternary ammonium active or mixture of actives, containing less than about 5% organic solvent or water, is less than about 50°C, more preferably less than about 35°C, even more preferably less than about 20°C, and yet even more preferably less than about 10°C, or is amorphous and has no significant endothermic phase transition in the region from about -50°C to about 100°C.

[0085] The phase transition temperature can be measured with a Mettler TA 3000 differential scanning calorimeter with Mettler TC 10A Processor.

[0086] Typical suitable quaternary ammonium compounds or amine precursors are defined hereinafter.

Preferred Diester Quaternary Ammonium Active Compound (DEQA)

[0087] (1) The first type of DEQA preferably comprises, as the principal active, [DEQA (1)] compounds of the formula

$$\{R_{4-m}\text{-}N^{+}\text{-}[(CH_2)_n\text{-}Y\text{-}R^1]_m\}\,X^{-}$$

wherein each R substituent is either hydrogen, a short chain C_1 -C_6, preferably C_1 -C_3 alkyl or hydroxyalkyl group, e. g., methyl (most preferred), ethyl, propyl, hydroxyethyl, and the like, poly (C_{2-3} alkoxy), preferably polyethoxy, group, benzyl, or mixtures thereof; each m is 2 or 3; each n is from 1 to about 4, preferably 2; each Y is -O-(O)C-, -C(O)-O-, -NR-C(O)-, or -C(O)-NR-; the sum of carbons in each R^1, plus one when Y is -O-(O)C- or -NR-C(O) -, is C_{12}-C_{22}, preferably C_{14}-C_{20}, with each R^1 being a hydrocarbyl, or substituted hydrocarbyl group, and X- can be any quaternary ammonium-compatible anion, preferably, chloride, bromide, methylsulfate, ethylsulfate, sulfate, and nitrate, more preferably chloride or methyl sulfate (As used herein, the "percent of quaternary ammonium active" containing a given R^1 group is based upon taking a percentage of the total active based upon the percentage that the given R^1 group is, of the total R^1 groups present.);

[0088] (2) A second type of DEQA active [DEQA (2)] has the formula:

$$[R_3N^{+}CH_2CH(YR^1)(CH_2YR^1)]\,X^{-}$$

wherein each Y, R, R^1, and X^- have the same meanings as before. Such compounds include those having the formula:

$$[CH_3]_3\,N^{(+)}[CH_2CH(CH_2O(O)CR^1)O(O)CR^1]\,C1^{(-)}$$

wherein each R is a methyl or ethyl group and preferably each R^1 is in the range of C_{15} to C_{19}. As used herein, when the diester is specified, it can include the monoester that is present. The amount of monoester that can be present is the same as in DEQA (1).

[0089] These types of agents and general methods of making them are disclosed in U.S. Pat. No. 4,137,180, Naik et al., issued Jan. 30, 1979, which is incorporated herein by reference. An example of preferred DEQA (2) is the "propyl" ester quaternary ammonium active having the formula 1,2-di(acyloxy)-3-trimethylammoniopropane chloride, where the acyl is the same as that of FA^1 disclosed hereinafter.

[0090] Some preferred wrinkle compositions of the present invention contain as an essential component from about 0.025% to about 10%, preferably from about 0.05% to about 5%, more preferably from about 0.1% to about 3%, and even more preferably from about 0.2% to about 2% by weight of the composition, of quaternary ammonium active having the formula:

$$[R^1\,C(O)OC_2H_4]_mN^{+}(R)_{4-m}\,X^{-}$$

wherein each R^1 in a compound is a C_6-C_{22} hydrocarbyl group, preferably having an IV from about 70 to about 140 based upon the IV of the equivalent fatty acid with the cis/trans ratio preferably being as described hereinafter, m is a number from 1 to 3 on the weight average in any mixture of compounds, each R in a compound is a C_{1-3} alkyl or hydroxy alkyl group, the total of m and the number of R groups that are hydroxyethyl groups equaling 3, and X is a quaternary ammonium compatible anion, preferably methyl sulfate. Preferably the cis:trans isomer ratio of the fatty acid (of the C18:1 component) is at least about 1:1, preferably about 2:1, more preferably about 3:1, and even more preferably about 4:1, or higher.

[0091] These preferred compounds, or mixtures of compounds, have (a) either a Hunter "L" transmission of at least

about 85, typically from about 85 to about 95, preferably from about 90 to about 95, more preferably above about 95, if possible, (b) only low, relatively non-detectable levels, at the conditions of use, of odorous compounds selected from the group consisting of: isopropyl acetate; 2,2'-ethylidenebis(oxy)bis-propane; 1,3,5-trioxane; and/or short chain fatty acid (4-12, especially 6-10, carbon atoms) esters, especially methyl esters; or (c) preferably, both.

[0092] The Hunter L transmission is measured by (1) mixing the quaternary ammonium active with solvent at a level of about 10% of active, to assure clarity, the preferred solvent being ethoxylated (one mole EO) 2,2,4-trimethyl-1,3-pentanediol and (2) measuring the L color value against distilled water with a Hunter ColorQUEST® colorimeter made by Hunter Associates Laboratory, Reston, Virginia.

[0093] The level of odorant is defined by measuring the level of odorant in a headspace over a sample of the quaternary ammonium active (about 92% active). Chromatograms are generated using about 200 mL of head space sample over about 2.0 grams of sample. The head space sample is trapped on to a solid absorbent and thermally desorbed onto a column directly via cryofocussing at about -100°C. The identifications of materials is based on the peaks in the chromatograms. Some impurities identified are related to the solvent used in the quaternization process, (e.g., ethanol and isopropanol). The ethoxy and methoxy ethers are typically sweet in odor. There are C_6 -C_8 methyl esters found in a typical current commercial sample, but not in the typical quaternary ammonium actives of this invention. These esters contribute to the perceived poorer odor of the current commercial samples. The level of each odorant in ng/L found in the head space over a preferred active is as follows: Isopropyl acetate - < 1; 1,3,5-trioxane - < 5; 2,2'-ethylidenebis (oxy)-bispropane - < 1; C_6 methyl ester - < 1; C_8 Methyl ester - < 1; and C_{10} Methyl ester - < 1.

[0094] The acceptable level of each odorant is as follows: isopropyl acetate should be less than about 5, preferably less than about 3, and more preferably less than about 2, nanograms per liter (ηg/L.); 2,2'-ethylidenebis(oxy)bis-propane should be less than about 200, preferably less than about 100, more preferably less than about 10, and even more preferably less than about 5, nanograms per liter (ηg/L.); 1,3,5-trioxane should be less than about 50, preferably less than about 20, more preferably less than about 10, and even more preferably less than about 7, nanograms per liter (ηg/L.); and/or each short chain fatty acid (4-12, especially 6-10, carbon atoms) ester, especially methyl esters should be less than about 4, preferably less than about 3, and more preferably less than about 2, nanograms per liter (ηg/L.).

[0095] The elimination of color and odor materials can either be accomplished after formation of the compound, or, preferably, by selection of the reactants and the reaction conditions. Preferably, the reactants are selected to have good odor and color. For example, it is possible to obtain fatty acids, or their esters, for sources of the long fatty acyl group, that have good color and odor and which have extremely low levels of short chain (C_{4-12}, especially C_{6-10}) fatty acyl groups. Also, the reactants can be cleaned up prior to use. For example, the fatty acid reactant can be double or triple distilled to remove color and odor causing bodies and remove short chain fatty acids. Additionally, the color of a triethanolamine reactant, if used, needs to be controlled to a low color level (e.g., a color reading of about 20 or less on the APHA scale). The degree of clean up required is dependent on the level of use, clarity of the product, and the presence of other ingredients. For example, adding a dye or starting with an opaque product can cover up some colors. However, for clear and/or light colored products, the color must be almost non-detectable. This is especially true as the level of the quaternary ammonium compound used in the product goes up. The degree of clean up would be especially important in products sold as concentrates that are intended for dilution by the consumer. Similarly, the odor can be covered up by higher levels of perfume, but as perfume level increases, cost associated with this approach increases too, also many consumers prefer a product with a lighter scent which precludes the approach of using higher perfume levels. Odor quality can be further improved by use of, e.g., ethanol as the quaternization reaction solvent.

[0096] Preferred biodegradable quaternary ammonium compounds comprise quaternary ammonium salt, the quaternary ammonium salt being a quaternized product of the condensation reaction between:

a)-a fraction of saturated or unsaturated, linear or branched fatty acids, or of derivatives of said acids, said fatty acids or derivatives each possessing a hydrocarbon chain in which the number of atoms is between 5 and 21, and
b)-triethanolamine,

characterized in that said condensation product has an acid value, measured by titration of the condensation product with a standard KOH solution against a phenolphthalein indicator, of less than about 6.5.

[0097] The acid value is preferably less than or equal to about 5, more preferably less than about 3.

[0098] The acid value is determined by titration of the condensation product with a standard KOH solution against a phenolphthalein indicator according to ISO#53402. The Acid Value (AV) is expressed as mg KOH/g of the condensation product.

[0099] These quaternary ammonium compounds for use herein are typically mixtures of materials. The weight percentages of compounds wherein one (monoester), two (diester), or three (triester) of the triethanolamine hydroxy groups is esterified with a fatty acyl group are as follows: Monoester - from about 12% to about 22%; diester - from about 43% to about 57%; and triester - from about 13% to about 28%. These compounds, as formed and used in the

formulation of wrinkle compositions, typically contain from about 6% to about 20% by weight of solvent, e.g., from about 3% to about 10% of a lower molecular alcohol like ethanol and from about 3% to about 10% of solvent that is more hydrophobic, like hexylene glycol.

[0100] Preferred cationic, preferably biodegradable, quaternary, ammonium compounds can contain the group -(O) CR^1 which is derived from animal fats, unsaturated, and polyunsaturated, fatty acids, e.g., oleic acid, and/or partially hydrogenated fatty acids, derived from vegetable oils and/or partially hydrogenated vegetable oils, such as, canola oil, safflower oil, peanut oil, sunflower oil, corn oil, soybean oil, tall oil, rice bran oil, etc. Non-limiting examples of fatty acids (FA) are listed in U.S. Pat. No. 5,759,990 at column 4, lines 45-66.

[0101] Mixtures of fatty acids, and mixtures of FAs that are derived from different fatty acids can be used, and are preferred. Nonlimiting examples of FA's that can be blended, to form FA's of this invention are as follows:

Fatty Acyl Group	FA^1	FA^2	FA^3
C_{14}	0	0	1
C_{16}	3	11	25
C_{18}	3	4	20
C14:1	0	0	0
C16:1	1	1	0
C18:1	79	27	45
C18:2	13	50	6
C18:3	1	7	0
Unknowns	0	0	3
Total	100	100	100
IV	99	125-138	56
cis/trans (C18:1)	5 - 6	Not Available	7
TPU	14	57	6

[0102] FA^1 is a partially hydrogenated fatty acid prepared from canola oil, FA^2 is a fatty acid prepared from soy bean oil, and FA^3 is a slightly hydrogenated tallow fatty acid.

[0103] Preferred quaternary ammonium actives contain an effective amount of molecules containing two ester linked hydrophobic groups [$R^1C(CO)O$-], said actives being referred to herein as "DEQA's", are those that are prepared as a single DEQA from blends of all the different fatty acids that are represented (total fatty acid blend), rather than from blends of mixtures of separate finished DEQA's that are prepared from different portions of the total fatty acid blend.

[0104] It is preferred that at least a majority of the fatty acyl groups are unsaturated, e.g., from about 50% to 100%, preferably from about 55% to about 99%, more preferably from about 60% to about 98%, and that the total level of active containing polyunsaturated fatty acyl groups (TPU) be preferably from 0% to about 30%. The cis/trans ratio for the unsaturated fatty acyl groups is usually important, with the cis/trans ratio being from about 1:1 to about 50:1, the minimum being about 1:1, preferably at least about 3:1, and more preferably from about 4:1 to about 20:1. (As used herein, the "percent of quaternary ammonium active" containing a given R^1 group is the same as the percentage of that same R^1 group is to the total R^1 groups used to form all of the quaternary ammonium actives.)

[0105] The unsaturated, including the preferred polyunsaturated, fatty acyl and/or alkylene groups, discussed hereinbefore and hereinafter, surprisingly provide good dewrinkling and effective softening, but also provide better rewetting characteristics, good antistatic characteristics, and especially, superior recovery after freezing and thawing.

[0106] These unsaturated actives are also easier to process at lower temperatures. These highly unsaturated materials (total level of active containing polyunsaturated fatty acyl groups (TPU) being typically from about 3% to about 30%, with only the low amount of solvent that normally is associated with such materials, i.e., from about 5% to about 20%, preferably from about 8% to about 25%, more preferably from about 10 to about 20%, weight of the total quaternary ammonium/solvent mixture are easier to formulate into the product and remain in stable solutions, emulsions, and or dispersions longer. This ability to process the actives at low temperatures is especially important for the polyunsaturated groups, since it minimizes degradation. Additional protection against degradation can be provided when the compounds and wrinkle compositions contain effective antioxidants, chelants, and/or reducing agents, as disclosed hereinafter.

[0107] It will be understood that substituents R and R^1 can optionally be substituted with various groups such as alkoxy or hydroxyl groups, and can be straight, or branched so long as the R^1 groups maintain their basically hydrophobic character.

[0108] A preferred long chain DEQA is the DEQA prepared from sources containing high levels of polyunsaturation, i.e., N,N-di(acyl-oxyethyl)-N,N-methylhydroxyethylammonium methyl sulfate, where the acyl is derived from fatty acids containing sufficient polyunsaturation, e.g., mixtures of tallow fatty acids and soybean fatty acids. Another preferred

long chain DEQA is the dioleyl (nominally) DEQA, i.e., DEQA in which N,N-di(oleoyl-oxyethyl)-N,N-methylhydroxyethylammonium methyl sulfate is the major ingredient. Preferred sources of fatty acids for such DEQAs are vegetable oils, and/or partially hydrogenated vegetable oils, with high contents of unsaturated, e.g., oleoyl groups.

[0109] As used herein, when the DEQA diester (m=2) is specified, it can include the monoester (m=1) and/or triester (m=3) that are present. Preferably, at least about 30% of the DEQA is in the diester form, and from 0% to about 30% can be DEQA monoester, e.g., there are three R groups and one R^1 group.

[0110] The above compounds can be prepared using standard reaction chemistry. In one synthesis of a di-ester variation of DTDMAC, triethanolamine of the formula $N(CH_2CH_2OH)_3$ is esterified, preferably at two hydroxyl groups, with an acid chloride of the formula $R^1C(O)Cl$, to form an amine which can be made cationic by acidification (one R is H) to be one type of active, or then quaternized with an alkyl halide, RX, to yield the desired reaction product (wherein R and R^1 are as defined hereinbefore). However, it will be appreciated by those skilled in the chemical arts that this reaction sequence allows a broad selection of agents to be prepared.

[0111] In preferred DEQA (1) and DEQA (2) quaternary ammonium actives, each R^1 is a hydrocarbyl, or substituted hydrocarbyl, group, preferably, alkyl, monounsaturated alkenyl, and polyunsaturated alkenyl groups, with the quaternary ammonium active containing polyunsaturated alkenyl groups being preferably at least about 3%, more preferably at least about 5%, more preferably at least about 10%, and even more preferably at least about 15%, by weight of the total quaternary ammonium active present; the actives preferably containing mixtures of R^1 groups, especially within the individual molecules.

[0112] The DEQAs herein can also contain a low level of fatty acid, which can be from unreacted starting material used to form the DEQA and/or as a by-product of any partial degradation (hydrolysis) of the quaternary ammonium active in the finished composition. It is preferred that the level of free fatty acid be low, preferably below about 15%, more preferably below about 10%, and even more preferably below about 5%, by weight of the quaternary ammonium active.

[0113] The quaternary ammonium actives herein are preferably prepared by a process wherein a chelant, preferably a diethylenetriaminepentaacetate (DTPA) and/or an ethylene diamine-N,N'-disuccinate (EDDS) is added to the process. Another acceptable chelant is tetrakis-(2-hydroxylpropyl) ethylenediamine (TPED). Also, preferably, antioxidants are added to the fatty acid immediately after distillation and/or fractionation and/or during the esterification reactions and/or post-added to the finished quaternary ammonium active. The resulting active has reduced discoloration and malodor associated therewith.

[0114] The total amount of added chelating agent is preferably within the range of from about 10 ppm to about 5,000 ppm, more preferably within the range of from about 100 ppm to about 2500 ppm by weight of the formed quaternary ammonium active. The source of triglyceride is preferably selected from the group consisting of animal fats, vegetable oils, partially hydrogenated vegetable oils, and mixtures thereof. More preferably, the vegetable oil or partially hydrogenated vegetable oil is selected from the group consisting of canola oil, partially hydrogenated canola oil, safflower oil, partially hydrogenated safflower oil, peanut oil, partially hydrogenated peanut oil, sunflower oil, partially hydrogenated sunflower oil, corn oil, partially hydrogenated corn oil, soybean oil, partially hydrogenated soybean oil, tall oil, partially hydrogenated tall oil, rice bran oil, partially hydrogenated rice bran oil, and mixtures thereof. Most preferably, the source of triglyceride is canola oil, partially hydrogenated canola oil, and mixtures thereof. The process can also include the step of adding from about 0.01% to about 2% by weight of the composition of an antioxidant compound to any or all of the steps in the processing of the triglyceride up to, and including, the formation of the quaternary ammonium active.

[0115] The above processes produce a quaternary ammonium active with reduced coloration and malodor.

[0116] Additional actives that can be used herein are disclosed, at least generically for the basic structures, in U.S. Pat. Nos. 3,861,870, Edwards and Diehl; 4,308,151, Cambre; 3,886,075, Bernardino; 4,233,164, Davis; 4,401,578, Verbruggen; 3,974,076, Wiersema and Rieke; and 4,237,016, Rudkin, Clint, and Young, all of said patents being incorporated herein by reference. The additional actives herein are preferably those that are highly unsaturated versions of the traditional quaternary ammonium actives, i.e., di-long chain alkyl nitrogen derivatives, normally cationic materials, such as dioleyldimethylammonium chloride and imidazolinium compounds as described hereinafter. Examples of more biodegradable fabric quaternary ammonium actives can be found in U.S. Pat. Nos. 3,408,361, Mannheimer, issued Oct. 29, 1968; 4,709,045, Kubo et al., issued Nov. 24, 1987; 4,233,451, Pracht et al., issued Nov.11, 1980; 4,127,489, Pracht et al., issued Nov. 28, 1979; 3,689,424, Berg et al., issued Sept. 5, 1972; 4,128,485, Baumann et al., issued Dec. 5, 1978; 4,161,604, Elster et al., issued July 17, 1979; 4,189,593, Wechsler et al., issued Feb.19, 1980; and 4,339,391, Hoffman et al., issued July 13, 1982, said patents being incorporated herein by reference.

[0117] It will be understood that suitable wrinkle compositions can include combinations of quaternary ammonium actives disclosed herein.

Anion A

[0118] In the cationic nitrogenous salts herein, the anion A^-, which is any quaternary ammonium compatible anion, provides electrical neutrality. Most often, the anion used to provide electrical neutrality in these salts is from a strong acid, especially a halide, such as chloride, bromide, or iodide. However, other anions can be used, such as methylsulfate, ethylsulfate, acetate, formate, sulfate, carbonate, and the like. Chloride and methylsulfate are preferred herein as anion A. The anion can also, but less preferably, carry a double charge in which case A^- represents half a group.

[0119] In addition to lubricating fibers, quaternary ammonium compound disclosed herein can offer additional benefits including improved softening and handfeel as well as protection and/or restoration of fibers and fabric appearance.

(2)Liquid carrier

[0120] Another optional, but preferred, ingredient is a liquid carrier. The liquid carrier employed in the instant compositions is preferably at least primarily water due to its low cost, relative availability, safety, and environmental compatibility. The level of water in the liquid carrier is preferably at least about 50%, most preferably at least about 60%, by weight of the carrier. Mixtures of water and low molecular weight, e.g., <about 200, organic solvent, e.g., lower alcohols such as ethanol, propanol, isopropanol or butanol are useful as the carrier liquid. Low molecular weight alcohols include monohydric, dihydric (glycol, etc.) trihydric (glycerol, etc.), and higher polyhydric (polyols) alcohols.

(3) Dispersibility Aids

[0121] Relatively concentrated compositions containing both saturated and unsaturated diester quaternary ammonium compounds can be prepared that are stable without the addition of concentration aids. However, the compositions of the present invention may require organic and/or inorganic concentration aids to go to even higher concentrations and/or to meet higher stability standards depending on the other ingredients. These concentration aids which typically can be viscosity modifiers may be needed, or preferred, for ensuring stability under extreme conditions when particular softener active levels are used. The surfactant concentration aids are typically selected from the group consisting of (1) single long chain alkyl cationic surfactants; (2) nonionic surfactants; (3) amine oxides; (4) fatty acids; and (5) mixtures thereof. These aids are described in WO 94/20597, specifically on page 14, line 12 to page 20, line 12, which is herein incorporated by reference.

[0122] When said dispersibility aids are present, the total level is from 0.1% to 20%, preferably from 0.2% to 10%, more preferably from 0.5% to 5%, and even more preferably from 0.5% to 2% by weight of the composition. These materials can either be added as part of the active softener raw material, (I), e.g., the mono-long chain alkyl cationic surfactant and/or the fatty acid which are reactants used to form the biodegradable fabric softener active as discussed hereinbefore, or added as a separate component. The total level of dispersibility aid includes any amount that may be present as part of component (I).

[0123] Inorganic viscosity/dispersibility control agents which can also act like or augment the effect of the surfactant concentration aids, include water-soluble, ionizable salts which can also optionally be incorporated into the compositions of the present invention. A wide variety of ionizable salts can be used. Examples of suitable salts are the halides of the Group IA and IIA metals of the Periodic Table of the Elements, e.g., calcium chloride, magnesium chloride, sodium chloride, potassium bromide, and lithium chloride. The ionizable salts are particularly useful during the process of mixing the ingredients to make the compositions herein, and later to obtain the desired viscosity. The amount of ionizable salts used depends on the amount of active ingredients used in the compositions and can be adjusted according to the desires of the formulator. Typical levels of salts used to control the composition viscosity are from about 20 to about 20,000 parts per million (ppm), preferably from about 20 to about 11,000 ppm, by weight of the composition.
Alkylene polyammonium salts can be incorporated into the composition to give viscosity control in addition to or in place of the water-soluble, ionizable salts above. In addition, these agents can act as scavengers, forming ion pairs with anionic detergent carried over from the main wash, in the rinse, and on the fabrics, and may improve softness performance. These agents may stabilize the viscosity over a broader range of temperature, especially at low temperatures, compared to the inorganic electrolytes.
Specific examples of alkylene polyammonium salts include l-lysine monohydrochloride and 1,5-diammonium 2-methyl pentane dihydrochloride.

(4)-Stabilizers

[0124] Stabilizers can be present in the compositions of the present invention. The term "stabilizer," as used herein, includes antioxidants and reductive agents.

[0125] These agents are present at a level of from 0% to about 2%, preferably from about 0.01% to about 0.2%,

more preferably from about 0.035% to about 0.1% for antioxidants, and more preferably from about 0.01% to about 0.2% for reductive agents. These assure good odor stability under long term storage conditions for the compositions and compounds stored in molten form. The use of antioxidants and reductive agent stabilizers is especially critical for low scent products (low perfume).

[0126] Examples of antioxidants that can be added to the compositions of this invention include a mixture of ascorbic acid, ascorbic palmitate, propyl gallate, available from Eastman Chemical Products, Inc., under the trade names Tenox® PG and Tenox S-1; a mixture of BHT (butylated hydroxytoluene), BHA (butylated hydroxyanisole), propyl gallate, and citric acid, available from Eastman Chemical Products, Inc., under the trade name Tenox-6; butylated hydroxytoluene, available from UOP Process Division under the trade name Sustane® BHT; tertiary butylhydroquinone, Eastman Chemical Products, Inc., as Tenox TBHQ; natural tocopherols, Eastman Chemical Products, Inc., as Tenox GT-1/GT-2; and butylated hydroxyanisole, Eastman Chemical Products, Inc., as BHA; long chain esters (C_8-C_{22}) of gallic acid, e.g., dodecyl gallate; Irganox® 1010; Irganox® 1035; Irganox® B 1171; Irganox® 1425; Irganox® 3114; Irganox® 3125; and mixtures thereof; preferably Irganox® 3125, Irganox® 1425, Irganox® 3114, and mixtures thereof; more preferably Irganox® 3125 alone. The chemical names and CAS numbers for some of the above stabilizers are listed in Table II below.

TABLE II

Antioxidant	CAS No.	Chemical Name used in Code of Federal Regulations
Irganox® 1010	6683-19-8	Tetrakis (methylene(3,5-di-tert-butyl-4 hydroxyhydrocinnamate)) methane
Irganox® 1035	41484-35-9	Thiodiethylene bis(3,5-di-tert-butyl-4-hydroxyhydrocinnamate
Irganox® 1098	23128-74-7	N,N'-Hexamethylene bis(3,5-di-tert-butyl-4-hydroxyhydrocinnamamide
Irganox® B 1171	31570-04-4	
	23128-74-7	1:1 Blend of Irganox® 1098 and Irgafos® 168
Irganox® 1425	65140-91-2	Calcium bis(monoethyl(3,5-di-tert-butyl-4-hydroxybenzyl)phosphonate)
Irganox® 3114	65140-91-2	Calcium bis(monoethyl(3,5-di-tert-butyl-4-hydroxybenzyl)phosphonate)
Irganox® 3125 acid	34137-09-2	3,5-Di-tert-butyl-4-hydroxy-hydrocinnamic
		triester with 1,3,5-tris(2-hydroxyethyl)-S-triazine-2,4,6-(1 H, 3H, 5H)-trione
Irgafos® 168	31570-04-4	Tris(2,4-di-tert-butyl-phenyl)phosphite

[0127] Examples of reductive agents include sodium borohydride, hypophosphorous acid, Irgafos® 168, and mixtures thereof.

5- PRESERVATIVE

[0128] Optionally, but preferably, antimicrobial preservative can be added to the composition of the present invention. Contamination by certain microorganisms with subsequent microbial growth can result in an unsightly and/or malodorous solution. Because microbial growth in solutions is highly objectionable when it occurs, it is highly preferable to include an antimicrobial preservative, which is effective for inhibiting and/or regulating microbial growth in order to increase storage stability of the composition.

[0129] It is preferable to use a broad spectrum preservative, e.g., one that is effective on both bacteria (both gram positive and gram negative) and fungi. A limited spectrum preservative, e.g., one that is only effective on a single group of microorganisms, e.g., fungi, can be used in combination with a broad spectrum preservative or other limited spectrum preservatives with complimentary and/or supplementary activity. A mixture of broad spectrum preservatives can also be used. In some cases where a specific group of microbial contaminants is problematic (such as Gram negatives), aminocarboxylate chelators, such as those described hereinbefore, can be used alone or as potentiators in conjunction with other preservatives. These chelators which include, e.g., ethylenediaminetetraacetic acid (EDTA), hydroxyethylenediaminetriacetic acid, diethylenetriaminepentaacetic acid, and other aminocarboxylate chelators, and mixtures thereof, and their salts, and mixtures thereof, can increase preservative effectiveness against Gram-negative bacteria, especially *Pseudomonas* species.

[0130] Antimicrobial preservatives useful in the present invention include biocidal compounds, i.e., substances that kill microorganisms, or biostatic compounds, i.e., substances that inhibit and/or regulate the growth of microorganisms. Well known preservatives such as short chain alkyl esters of p-hydroxybenzoic acid, commonly known as parabens; N-(4-chlorophenyl)-N'-(3,4-dichlorophenyl) urea, also known as 3,4,4'-trichlorocarbanilide or triclocarban; 2,4,4'-trichloro-2'-hydroxy diphenyl ether, commonly known as triclosan are useful preservative in the present invention.

[0131] Still other preferred preservatives are the water-soluble preservatives, i.e. those that have a solubility in water

of at least about 0.3 g per 100 ml of water, i.e., greater than about 0.3% at room temperature, preferably greater than about 0.5% at room temperature.

[0132] The preservative in the present invention is included at an effective amount. The term "effective amount" as herein defined means a level sufficient to prevent spoilage, or prevent growth of inadvertently added microorganisms, for a specific period of time. In other words, the preservative is not being used to kill microorganisms on the surface onto which the composition is deposited in order to eliminate odors produced by microorganisms. Instead, it is preferably being used to prevent spoilage of the solution in order to increase the shelf-life of the composition. Preferred levels of preservative are from about 0.0001% to about 0.5%, more preferably from about 0.0002% to about 0.2%, most preferably from about 0.0003% to about 0.1%, by weight of the usage composition.

[0133] The preservative can be any organic preservative material which will not cause damage to fabric appearance, e.g., discoloration, coloration, bleaching. Preferred water-soluble preservatives include organic sulfur compounds, halogenated compounds, cyclic organic nitrogen compounds, low molecular weight aldehydes, quaternary ammonium compounds, dehydroacetic acid, phenyl and phenolic compounds, and mixtures thereof. Non-limiting examples of preferred water-soluble preservatives for use in the present invention can be found in U.S. Patent 5,714,137, incorporated hereinbefore by reference, as well as co-pending application PCT/US 98/12154 pages 29 to 36.

[0134] Preferred water-soluble preservatives for use in the present invention are organic sulfur compounds. Some non-limiting examples of organic sulfur compounds suitable for use in the present invention are:

(a) 3-Isothiazolone Compounds

[0135] A preferred preservative is an antimicrobial, organic preservative containing 3-isothiazolone groups. This class of compounds is disclosed in U.S. Pat. No. 4,265,899, Lewis et al., issued May 5, 1981, and incorporated herein by reference. A preferred preservative is a water-soluble mixture of 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one, more preferably a mixture of about 77% 5-chloro-2-methyl-4-isothiazolin-3-one and about 23% 2-methyl-4-isothiazolin-3-one, a broad spectrum preservative available as a 1.5% aqueous solution under the trade name Kathon® CG by Rohm and Haas Company.

[0136] When Kathon® is used as the preservative in the present invention it is present at a level of from about 0.0001% to about 0.01%, preferably from about 0.0002% to about 0.005%, more preferably from about 0.0003% to about 0.003%, most preferably from about 0.0004% to about 0.002%, by weight of the composition.

[0137] Other isothiazolins include 1,2-benzisothiazolin-3-one, available under the trade name Proxel® products; and 2-methyl-4,5-trimethylene-4-isothiazolin-3-one, available under the trade name Promexal®. Both Proxel and Promexal are available from Zeneca. They have stability over a wide pH range (i.e., 4-12). Neither contain active halogen and are not formaldehyde releasing preservatives. Both Proxel and Promexal are effective against typical Gram negative and positive bacteria, fungi and yeasts when used at a level from about 0.001% to about 0.5%, preferably from about 0.005% to about 0.05%, and most preferably from about 0.01% to about 0.02% by weight of the usage composition.

(b) Sodium Pyrithione

[0138] Another preferred organic sulfur preservative is sodium pyrithione, with water solubility of about 50%. When sodium pyrithione is used as the preservative in the present invention it is typically present at a level of from about 0.0001% to about 0.01 %, preferably from about 0.0002% to about 0.005%, more preferably from about 0.0003% to about 0.003%, by weight of the usage composition.

[0139] Mixtures of the preferred organic sulfur compounds can also be used as the preservative in the present invention.

6- Antimicrobial active

[0140] The composition may suitably use an optional solubilized, water-soluble antimicrobial active, useful in providing protection against organisms that become attached to the treated material. The free, uncomplexed antimicrobial, e.g., antibacterial, active provides an optimum antibacterial performance.

[0141] Sanitization of fabrics can be achieved by the compositions of the present invention containing, antimicrobial materials, e.g., antibacterial halogenated compounds, quaternary compounds, and phenolic compounds.

[0142] Biguanides. Some of the more robust antimicrobial halogenated compounds which can function as disinfectants/sanitizers as well as finish product preservatives (vide infra), and are useful in the compositions of the present invention include 1,1'-hexamethylene bis(5-(p-chlorophenyl)biguanide), commonly known as chlorhexidine, and its salts, e.g., with hydrochloric, acetic and gluconic acids. The digluconate salt is highly water-soluble, about 70% in water, and the diacetate salt has a solubility of about 1.8% in water. When chlorhexidine is used as a sanitizer in the present invention it is typically present at a level of from about 0.001% to about 0.4%, preferably from about 0.002%

to about 0.3%, and more preferably from about 0.01% to about 0.1%, by weight of the usage composition. In some cases, a level of from about 1 % to about 2% may be needed for virucidal activity.

[0143] Other useful biguanide compounds include Cosmoci® CQ®, Vantocil® IB, including poly (hexamethylene biguanide) hydrochloride. Other useful cationic antimicrobial agents include the bis-biguanide alkanes. Usable water soluble salts of the above are chlorides, bromides, sulfates, alkyl sulfonates such as methyl sulfonate and ethyl sulfonate, phenylsulfonates such as p-methylphenyl sulfonates, nitrates, acetates, gluconates, and the like.

[0144] As stated hereinbefore, the bis biguanide of choice is chlorhexidine and its salts, e.g., digluconate, dihydrochloride, diacetate, and mixtures thereof.

[0145] Quaternary Compounds. A wide range of quaternary compounds can also be used as antimicrobial actives, in conjunction with the preferred surfactants, for compositions of the present invention that do not contain cyclodextrin. Non-limiting examples of useful quaternary compounds include: (1) benzalkonium chlorides and/or substituted benzalkonium chlorides such as commercially available Barquat® (available from Lonza), Maquat® (available from Mason), Variquat® (available from Witco/Sherex), and Hyamine® (available from Lonza); (2) dialkyl quaternary such as Bardac® products of Lonza, (3) N-(3-chloroallyl) hexaminium chlorides such as Dowicide® and Dowicil® available from Dow; (4) benzethonium chloride such as Hyamine® 1622 from Rohm & Haas; (5) methylbenzethonium chloride represented by Hyamine® 10X supplied by Rohm & Haas, (6) cetylpyridinium chloride such as Cepacol chloride available from of Merrell Labs. Typical concentrations for biocidal effectiveness of these quaternary compounds range from about 0.001% to about 0.8%, preferably from about 0.005% to about 0.3%, more preferably from about 0.01% to 0.2%, by weight of the usage composition. The corresponding concentrations for the concentrated compositions are from about 0.003% to about 2%, preferably from about 0.006% to about 1.2%, and more preferably from about 0.1 % to about 0.8% by weight of the concentrated compositions.

[0146] Other preservatives which are conventional in the art, such as described in US 5,593, 670 incorporated herein by reference, may also be used herein.

7-Perfume

[0147] The present invention can contain a perfume. Suitable perfumes are disclosed in U.S. Pat. 5,500,138, said patent being incorporated herein by reference.

[0148] As used herein, perfume includes fragrant substance or mixture of substances including natural (i.e., obtained by extraction of flowers, herbs, leaves, roots, barks, wood, blossoms or plants), artificial (i.e., a mixture of different nature oils or oil constituents) and synthetic (i.e., synthetically produced) odoriferous substances. Such materials are often accompanied by auxiliary materials, such as fixatives, extenders, stabilizers and solvents. These auxiliaries are also included within the meaning of "perfume", as used herein. Typically, perfumes are complex mixtures of a plurality of organic compounds.

[0149] Examples of perfume ingredients useful in the perfumes of the present invention compositions include, but are not limited to, hexyl cinnamic aldehyde; amyl cinnamic aldehyde; amyl salicylate; hexyl salicylate; terpineol; 3,7-dimethyl-cis-2,6-octadien-1-ol; 2,6-dimethyl-2-octanol; 2,6-dimethyl-7-octen-2-ol; 3,7-dimethyl-3-octanol; 3,7-dimethyl-trans-2,6-octadien-1-ol; 3,7-dimethyl-6-octen-1-ol; 3,7-dimethyl-1-octanol; 2-methyl-3-(para-tert-butylphenyl)-propionaldehyde; 4-(4-hydroxy-4-methylpentyl)-3-cyclohexene-1-carboxaldehyde; tricyclodecenyl propionate; tricyclodecenyl acetate; anisaldehyde; 2-methyl-2-(para-iso-propylphenyl)-propionaldehyde; ethyl-3-methyl-3-phenyl glycidate; 4-(para-hydroxyphenyl)-butan-2-one; 1-(2,6,6-trimethyl-2-cyclohexen-1-yl)-2-buten-1-one; para-methoxyacetophenone; para-methoxy-alpha-phenylpropene; methyl-2-n-hexyl-3-oxo-cyclopentane carboxylate; undecalactone gamma.

[0150] Additional examples of fragrance materials include, but are not limited to, orange oil; lemon oil; grapefruit oil; bergamot oil; clove oil; dodecalactone gamma; methyl-2-(2-pentyl-3-oxo-cyclopentyl) acetate; beta-naphthol methyl-ether; methyl-beta-naphthylketone; coumarin; decylaldehyde; benzaldehyde; 4-tert-butylcyclohexyl acetate; alpha,alpha-dimethylphenethyl acetate; methylphenylcarbinyl acetate; Schiff's base of 4-(4-hydroxy-4-methylpentyl)-3-cyclohexene-1-carboxaldehyde and methyl anthranilate; cyclic ethyleneglycol diester of tridecandioic acid; 3,7-dimethyl-2,6-octadiene-1-nitrile; ionone gamma methyl; ionone alpha; ionone beta; petitgrain; methyl cedrylone; 7-acetyl-1,2,3,4,5,6,7,8-octahydro-1,1,6,7-tetramethyl-naphthalene; ionone methyl; methyl-1,6,10-trimethyl-2,5,9-cyclododecatrien-1-yl ketone; 7-acetyl-1,1,3,4,4,6-hexamethyl tetralin; 4-acetyl-6-tert-butyl-1,1-dimethyl indane; benzophenone; 6-acetyl-1,1,2,3,3,5-hexamethyl indane; 5-acetyl-3-isopropyl-1,1,2,6-tetramethyl indane; 1-dodecanal; 7-hydroxy-3,7-dimethyl octanal; 10-undecen-1-al; iso-hexenyl cyclohexyl carboxaldehyde; formyl tricyclodecan; cyclopentadecanolide; 16-hydroxy-9-hexadecenoic acid lactone; 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta-gamma-2-benzopyrane; ambroxane; dodecahydro-3a,6,6,9a-tetramethylnaphtho-[2,1b]furan; cedrol; 5-(2,2,3-trimethylcyclopent-3-enyl)-3-methylpentan-2-ol; 2-ethyl-4-(2,2,3-trimethyl-3-cyclopenten-1-yl)-2-buten-1-ol; caryophyllene alcohol; cedryl acetate; para-tert-butylcyclohexyl acetate; patchouli; olibanum resinoid; labdanum; vetivert; copaiba balsam; fir balsam; and condensation products of: hydroxycitronellal and methyl anthranilate; hydroxycitronellal and indol; phe-

nyl acetaldehyde and indol; 4-(4-hydroxy-4-methyl pentyl)-3-cyclohexene-1-carboxaldehyde and methyl anthranilate. More examples of perfume components are geraniol; geranyl acetate; linalool; linalyl acetate; tetrahydrolinalool; citronellol; citronellyl acetate; dihydromyrcenol; dihydromyrcenyl acetate; tetrahydromyrcenol; terpinyl acetate; nopol; nopyl acetate; 2-phenylethanol; 2-phenylethyl acetate; benzyl alcohol; benzyl acetate; benzyl salicylate; benzyl benzoate; styrallyl acetate; dimethylbenzylcarbinol; trichloromethylphenylcarbinyl methylphenylcarbinyl acetate; isononyl acetate; vetiveryl acetate; vetiverol; 2-methyl-3-(p-tert-butylphenyl)-propanal; 2-methyl-3-(p-isopropylphenyl)-propanal; 3-(p-tert-butylphenyl)-propanal; 4-(4-methyl-3-pentenyl)-3-cyclohexenecarbaldehyde; 4-acetoxy-3-pentyltetrahydropyran; methyl dihydrojasmonate; 2-n-heptylcyclopentanone; 3-methyl-2-pentyl-cyclopentanone; n-decanal; n-dodecanal; 9-decenol-1; phenoxyethyl isobutyrate; phenylacetaldehyde dimethylacetal; phenylacetaldehyde diethylacetal; geranonitrile; citronellonitrile; cedryl acetal; 3-isocamphylcyclohexanol; cedryl methylether; isolongifolanone; aubepine nitrile; aubepine; heliotropine; eugenol; vanillin; diphenyl oxide; hydroxycitronellal ionones; methyl ionones; isomethyl ionomes; irones; cis-3-hexenol and esters thereof; indane musk fragrances; tetralin musk fragrances; isochroman musk fragrances; macrocyclic ketones; macrolactone musk fragrances; ethylene brassylate.

[0151] The perfumes useful in the present invention compositions are substantially free of halogenated materials and nitromusks.

[0152] Suitable solvents, diluents or carriers for perfumes ingredients mentioned above are for examples, ethanol, isopropanol, diethylene glycol, monoethyl ether, dipropylene glycol, diethyl phthalate, triethyl citrate, etc. The amount of such solvents, diluents or carriers incorporated in the perfumes is preferably kept to the minimum needed to provide a homogeneous perfume solution.

[0153] Perfume can be present at a level of from 0% to 10%, preferably from 0.1% to 5%, and more preferably from 0.2% to 3%, by weight of the finished composition. Fabric softener compositions of the present invention provide improved fabric perfume deposition.

[0154] Perfume ingredients may also be suitably added as releasable fragrances, for example, as pro-perfumes or pro-fragrances as described in U.S. 5,652,205 Hartman et al., issued July 29, 1997, WO95/04809, WO96/02625, PCT US97/14610 filed 19 August 1997 and claiming priority of 19 August 1996, EP-A-0,752,465, co-pending application EP 98870227.0, EP 98870226.2, EP 99870026.4, and EP 99870025.6; all incorporated herein by reference.

8- Soil Release Agent

[0155] Soil Release agents are desirably used in compositions of the instant invention. Any polymeric soil release agent known to those skilled in the art can optionally be employed in the compositions of this invention. Polymeric soil release agents are characterized by having both hydrophilic segments, to hydrophilize the surface of hydrophobic fibers, such as polyester and nylon, and hydrophobic segments, to deposit upon hydrophobic fibers and remain adhered thereto through completion of washing and rinsing cycles and, thus, serve as an anchor for the hydrophilic segments. This can enable stains occurring subsequent to treatment with the soil release agent to be more easily cleaned in later washing procedures.

[0156] If utilized, soil release agents will generally comprise from about 0.01% to about 10.0%, by weight, of the detergent compositions herein, typically from about 0.1% to about 5%, preferably from about 0.2% to about 3.0%.

[0157] The following, all included herein by reference, describe soil release polymers suitable for use in the present invention. U.S. 3,959,230 Hays, issued May 25, 1976; U.S. 3,893,929 Basadur, issued July 8, 1975; U.S. 4,000,093, Nicol, et *al.*, issued December 28, 1976; U.S. Patent 4,702,857 Gosselink, issued October 27, 1987; U.S. 4,968,451, Scheibel *et al.*, issued November 6; U.S. 4,702,857, Gosselink, issued October 27, 1987; U.S. 4,711,730, Gosselink *et* al., issued December 8, 1987; U.S. 4,721,580, Gosselink, issued January 26, 1988; U.S. 4,877,896, Maldonado *et al.*, issued October 31, 1989; U.S. 4,956,447, Gosselink *et al.*, issued September 11, 1990; U.S. 5,415,807 Gosselink *et al.*, issued May 16, 1995; European Patent Application 0 219 048, published April 22, 1987 by Kud, *et al.*.

[0158] Further suitable soil release agents are described in U.S. 4,201,824, Violland *et al.;* U.S. 4,240,918 Lagasse *et al.;* U.S. 4,525,524 Tung *et al.;* U.S. 4,579,681, Ruppert *et al.;* U.S. 4,240,918; U.S. 4,787,989; U.S. 4,525,524; EP 279,134 A, 1988, to Rhone-Poulenc Chemie; EP 457,205 A to BASF (1991); and DE 2,335,044 to Unilever N. V., 1974 all incorporated herein by reference.

[0159] Commercially available soil release agents include the METOLOSE SM100, METOLOSE SM200 manufactured by Shin-etsu Kagaku Kogyo K.K., SOKALAN type of material, e.g., SOKALAN HP-22, available from BASF (Germany), ZELCON 5126 (from Dupont) and MILEASE T (from ICI).

9-pH

[0160] An optional requirement of the compositions according to the present invention is that the pH is greater than 3, preferably between 5 and 7, more preferably in the range of 5.5 to 6.5.. This range is preferred for fabric safety. When a lubricant of the diester quaternary ammonium type is used, it is most preferred to have the conventional pH

range, as measured in the neat compositions at 20 °C, of from 2.0 to 5, preferably in the range of 2.5 to 4.5, preferably about 2.5 to about 3.5. The pH of these compositions herein can be regulated by the addition of a Bronsted acid.

10- Other Optional Ingredients

[0161] The present invention can include optional components conventionally used in textile treatment compositions, for example, colorants, preservatives, bactericides, optical brighteners, opacifiers, anti-shrinkage agents, germicides, fungicides, anti-oxidants, dye fixing agent as described in EP 931133, enzymes, chelating agents, cyclodextrin as described in WO 98/56888, metallic salts to absorb amine and sulfur-containing compounds and selected from the group consisting of copper salts, zinc salts, and mixtures thereof, water-soluble polyionic polymers, e.g., water-soluble cationic polymer like polyamines, other antistatic agent, insect and/or moth repelling agents, colorants and dyes, anti-clogging agent, and the like; typical disclosure of which can be found in WO 98/56888. Still another suitable optional are void fillers like isomalto oligosaccharide mixtures, and ingredients which provide shield protection against stain like hydroxypropylcellulose as well as other cellulosic polymer like carboxymethylcellulose. The compositions are preferably free of any material that would soil or stain fabric, and are also substantially free of starch. Typically, there should be less than about 0.5%, by weight of the composition, preferably less than about 0.3%, more preferably less than about 0.1%, by weight of the composition, of starch and/or modified starch.

Form of the composition

[0162] The composition of the invention may take a variety of physical form including liquid, liquid-gel, paste-like, foam in either aqueous or non-aqueous form, powder like granular and tablet forms. A preferred form of the composition is in a liquid form.

[0163] Non-limiting forms of articles of manufactures for the dispensing of the compositions of the invention includes aerosol, spray, foam, iron as well as refill and/or cartridge for such articles.

[0164] When in a liquid form, the composition is preferably dispensed by a dispensing means such as a spray dispenser, aerosol dispenser, or refill thereof. Still another preferred dispensing means is by incorporation of the composition of the invention in the ironing tank per se, or via a cartridge preferably adapted for the iron and/or the spray dispenser.

Spray Dispenser

[0165] The present invention also relates to such compositions incorporated into a spray dispenser to create an article of manufacture that can facilitate treatment of fabric articles and/or surfaces with the compositions according to the invention at a level that is effective. The spray dispenser comprises manually activated and non-manual powered (operated) spray means and a container containing the treating composition. Typical disclosure of such spray dispenser can be found in WO 96/04940 page 19 line 21 to page 22 line 27. Preferably, the spray dispenser is selected from spray dispenser comprising battery operated pump, spray dispenser comprising a trigger spray device, spray dispenser comprising a pressurized aerosol spray dispenser.

Method of use

[0166] There is provided a method of treating fabrics, in particular to provide durable press on fabric, i.e. for providing wrinkle resistant fabrics, which comprises the steps of contacting the fabrics with a composition or a resin of the invention, as defined herein before, and subsequently curing the composition, preferably using a domestic process.

[0167] Surprisingly, it has been found that this method also provides additional benefits like a reduction of the time and/or effort involved to iron fabrics, crease resistance to fabrics, post wash wrinkle resistance, in-wear wrinkle resistance, and a reduction of the fabric aging upon multiple application.

[0168] By "contacting", it is meant any steps that is suitable for providing a contact of the composition with the fabric. This can include by soaking, washing, rinsing, and/or spraying as well as by means of a dryer sheet onto which is adsorbed the composition. Preferably, the contacting occurs after the laundering and optional drying of the fabrics, e. g. by spraying. Accordingly, in this instance, the composition of the present invention is used as an ironing aid. Still another preferred process is where the contacting occurs after the laundering and optional drying of the fabrics, e.g. by spraying, more preferably by spraying from the iron spray dispenser and/or via the vaporisation holes from the iron sole. An effective amount of the composition can be sprayed onto fabric, wherein said fabric should not be sprayed to saturation. The fabric can be cured by ironing at the normal temperature at which it should be ironed. Still another preferred way of treating the fabrics is when the fabric can be sprayed with an effective amount of the composition, allowed to dry and then ironed, or sprayed and ironed immediately.

[0169] Domestic curing of the fabric can also be caused by the heat used to dry the fabric, e.g. by tumble drying. Ironing is also particularly advantageous for curing the fabric. Without to be bound by theory, it is believed that the shorter time or the low temperatures used to domestically cure the cross-linking components mean that the fabric is made resistant to wrinkles without changing its tactile, or drape properties.

[0170] Still another advantage of the present invention is that when polyquaternary amine resins are used, such as in particular with Kymene compounds, the domestic curing can occur at room temperature, i.e. from 15 to 30°C.

[0171] Still a further advantage of the above mentioned epichlorhydrin adducts is their usability in industrial treatment. Accordingly, there is also provided a method for treating fabric which comprises the steps of contacting the fabrics with a composition of the invention, and thereafter curing the fabrics. In this preferred method, the curing is that which is conventionally known in industrial process like padding.

[0172] In a still further aspect of the invention, the composition can be sprayed onto fabrics by an in-home de-wrinkling chamber containing the fabric to be dewrinkled, thereby providing ease of operation. Conventional personal as well as industrial de-wrinkling apparatuses are suitable for use herein. Traditionally, these apparatuses act by a steaming process which effects a relaxation of the fibers. Examples of home dewrinkling chambers include shower stalls. The spraying of the composition or compounds onto the fabrics can then occur within the chamber of the apparatus or before placing the fabrics into the chamber. As for the manual method of spraying, the spraying means should preferably be capable of providing droplets with a weight average diameter of from about 8 to about 100 μm, preferably from about 10 to about 50 μm. Preferably, the loading of moisture on fabrics made of natural and synthetic fibers is from about 5 to about 25%, more preferably from about 5 to about 10% by weight of the dried fabric. Other conventional steps that can be carried out in the dewrinkling apparatus can be applied such as heating which will provide the curing step and drying. Preferably, for optimum dewrinkling benefit, the temperature profile inside the chamber ranges from about 40°C to about 80°C, more preferably from about 50°C to about 70°C. The preferred length of the drying cycle is from about 15 to about 60 minutes, more preferably from about 20 to about 45 minutes.

[0173] The steaming step in the dewrinkling apparatus can also be eliminated if the composition is maintained at a temperature range from about 22°C (about 72° F) to about 76°C (170°F) before spraying.

[0174] The present invention encompasses the method of spraying a mist of an effective amount of solution of the invention composition onto fabric and/or fabric articles. Preferably, said fabric and/or fabric articles include, but are not limited to, clothes, curtains, drapes, upholstered furniture, carpeting, bed linens, bath linens, tablecloths, sleeping bags, tents, car interiors, etc.

[0175] The compositions herein are especially useful, when used to treat garments for extending the time before another wash cycle is needed. Such garments include uniforms and other garments which are normally treated in an industrial process, which can be dewrinkled and the time between treatments extended.

[0176] Also provided herein is an article of manufacture comprising a container and the composition of the invention in association with a set of instructions to use the composition in an amount effective to provide a solution to problems involving and/or provision of a benefit related to those selected from reducing wrinkles; improving the natural drape of fabrics, imparting a crisp finish to fabrics, reducing the time and/or effort involved to iron fabrics, imparting crease resistance to fabrics, imparting post wash wrinkle resistance to fabrics, imparting in-wear resistance to fabrics, imparting a reduction of the fabric aging upon multiple application. It is important that the consumer be aware of these additional benefits, since otherwise the consumer would not know that the composition would solve these problems and/or provide these benefits.

[0177] As used herein, the phrase " in association with" means the set of instructions are either directly printed on the container itself or presented in a separate manner including, but not limited to, a brochure, print advertisement, electronic advertisement, and/or verbal communication, so as to communicate the set of instructions to a consumer of the article of manufacture. The set of instructions preferably comprises the instruction to apply an effective amount of the composition, preferably by spraying, to provide the indicated benefit, e.g. wrinkles reduction; improving the natural drape of fabrics, imparting a crisp finish to fabrics, reducing the time and/or effort involved to iron fabrics, imparting crease resistance to fabrics, imparting post wash wrinkle resistance to fabrics, imparting in-wear wrinkle resistance to fabrics, and/or imparting a reduction of the fabric aging upon multiple application.

[0178] The invention is illustrated in the following non limiting examples, in which all percentages are on a weight basis unless otherwise stated.

[0179] In the examples, the abbreviated component identifications have the following meanings:

Resin #1	Polyamide/polyamine/epichlorohydrin resin commercially available under the tradename Kymene 557H from Hercules Inc.
Resin #2	Polyamide/polyamine/epichlorohydrin resin commercially available under the tradename Kymene ULX-2 from Hercules Inc.
Resin #3	Polyamide/polyamine/epichlorohydrin resin commercially available under the tradename Luresin KNU from BASF.

Luviskol K30	Polyvinylpyrrolidone (MW about 40,000 Dalton) available from BASF.
DC 949	Amino-functional silicone emulsion available from Dow Corning
Silwet L7200	Polyalkylene oxide grafted polydimethylsiloxane (Ratio EO/PO : 75/25; MW 19,000) available from Witco.
Silwet L7600	Polyalkylene oxide grafted polydimethylsiloxane (All EO; MW 4,000) available from Witco.
DEG	Diethyleneglycol

Example

[0180] The following are compositions according to the present invention :

	A	B	C	D	E
Resin #1	5%	4%	2.75%	-	-
Resin # 2	-	-	-	3%	-
Resin #3	-	-	-	-	5%
Luviskol K30	1%	-	2%	0.75%	0.75%
DC 949	-	2%	1.5%	0.5%	1.5%
Silwet L7200	2%	3%	1%	1.75%	1%
Silwet L7600	0.5%	1%	0.75%	0.5%	0.25%
DEG	0.25%	0.55%	0.25%	0.35%	0.55%
Perfume	0.05%	0.05%	0.05%	0.05%	0.05%
Water and Minors, e.g. preservative	Balance	Balance	Balance	Balance	Balance

Claims

1. A wrinkle reducing composition comprising:

   a)-a cross-linking resin having the property of being cationic; and
   b)-a component having the property of being co-cross linkable with the resin and/or a component comprising at least one unit which provides a dye transfer inhibiting benefit;

   with the proviso that when the cross-linking resin is a polyquaternary amine resins of the polyamide/polyamine/epichlorhydrin type present in an amount of 15% by weight, the amino functional polymer is not a polyethylene imine with 7 ethoxylations present in an amount of 5% by weight.

2. A composition according to Claim 1, wherein the cross-linking resin having the property of being cationic is selected from epichlorohydrin adducts of polyamine resins, polyethyleneimine resins, cationic starch, polydiallyldimethyl-ammonium chloride, and mixtures thereof, amine-aldehyde resins, amide-aldehyde resins, and mixtures thereof.

3. The composition of Claim 1, wherein said cross-linking resin has a molecular weight between 200 and 1,000,000, preferably between 500 and 100,000.

4. A composition according to any one of Claims 1-3, wherein the cross-linking resin having the property of being cationic is present in an amount of from 0.01% to 60% by weight.

5. A composition according to any one of Claims 1-4, wherein said cross-linking resin is an aldehyde containing cross-linking resin, and wherein said composition further comprises a catalyst, preferably present in an amount of from 10% to 50%, by weight of the cross-linking components or derivative thereof.

6. A composition according to any one of Claims 1-5, wherein the component having the property of being co-cross linkable with the resin is selected from polyamine polymers, amino-functional silicones, alkyl amines, and mixtures thereof.

7. A composition according to any one of Claims 1-6, wherein the component having the property of being co-cross linkable with the resin and/or the component comprising at least one unit which provides a dye transfer inhibiting benefit is present in an amount of from 0.01 to 20% by weight of the composition.

8. A composition according to any one of Claims 1-7, wherein the composition further comprises a lubricant, preferably selected from silicones, synthetic solid particles, quaternary ammonium compounds, and mixtures thereof.

9. A composition according to any one of Claims 1-8, wherein the composition is a liquid composition, preferably a liquid aqueous composition.

10. An article of manufacture comprising a container and a composition according to any one of Claims 1-9.

11. The article of manufacture of Claim 10, wherein the article is selected from an aerosol, a spray dispenser, a refill, a cartridge, an iron, and a foam dispenser.

12. The article of manufacture of Claim 11 wherein said article is a spray dispenser selected from spray dispenser comprising battery operated pump, spray dispenser comprising a trigger spray device, spray dispenser comprising a pressurized aerosol spray dispenser, spray dispenser comprising a non-manually operated spray dispenser.

13. A method for treating the fabrics which comprises the steps of contacting the fabric with a composition according to any one of Claims 1-9 or a resin as defined in any one of Claims 1-5 and subsequently cure the fabric.

14. A method according to Claim 13, wherein said method provides a reduction of the time and/or effort involved to iron fabrics.

15. A method according to either one of Claim 13 or 14, wherein said method provides crease resistance to fabrics

16. A method according to any one of Claims 13-15, wherein said method provides post wash wrinkle resistance.

17. A method according to any one of Claims 13-16, wherein said method provides in-wear wrinkle resistance.

18. A method according to any one of Claims 13-17, wherein said method provides a reduction of the fabric aging upon multiple application.

19. A method according to any one of Claims 13-18, wherein said method is performed in an in-home dewrinkling apparatus.

20. An article of manufacture comprising a container and the composition of any one of Claims 1-9 in association with instructions to use an effective amount of said composition on fabric to provide at least one benefit selected from the group consisting of: reducing wrinkles; improving the natural drape of fabrics, imparting a crisp finish to fabrics, reducing the time and/or effort involved to iron fabrics, imparting crease resistance to fabrics, imparting post wash wrinkle resistance to fabrics, imparting in-wear wrinkle resistance to fabrics, imparting a reduction of the fabric aging upon multiple application.

21. Use of a composition as defined in Claims 1-9, or cartridge as defined in Claim 11, in an iron for treating fabrics.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 87 0222

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	29 March 2000	Koegler-Hoffmann, S

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 99 87 0222

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